A Revision of the Genus *Alstonia* (Apocynaceae) [1]

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INTRODUCTION

THE GENUS *Alstonia* was proposed in a paper by Robert Brown read before the Wernerian Natural History Society in 1809 and published in 1811. It was named in honor of Charles Alston, Scottish physician and professor of botany at the University of Edinburgh. Four species were referred to this genus by Brown, namely, *A. scholaris, A. venenata, A. costata,* and *A. spectabilis.* Each of these is the type species of a section of *Alstonia;* therefore all the sections recognized in the present treatment, except § *Winchia,* were represented at that early date. To that great naturalist is to be given not only the credit for erecting the foundations for the genus, but also for having a marvelous perspicacity in recognizing a generic tie between such diverse elements as those known to him.

Five sections of *Alstonia,* 39 species, and 12 varieties are treated in the systematic section of the present paper. The scope and problems in the treatment are discussed before the taxonomy is elaborated.

The type of the genus is *A. scholaris,* and this species is in many respects the most important one in *Alstonia.* The specific epithet was derived from *lignum scholare,* a name applied to the plant because of the use of its wood for making writing tablets employed in schools. Reference to this was made in 1741 by Rumphius, who also noted other uses for the species.

The bark of *A. scholaris* has been reported to be the source of one of the most widely known and important of the popular drugs in the Philippines, and the product is very highly esteemed in the popular medicine of India, where it has found a place as a standard drug in the pharmacopoeia. It has been credited with the properties of being an astringent tonic, anthelmintic, alterative, antiperiodic, etc., useful in various febrile conditions as well as in chronic diarrhea and dysentery. A poultice made from the leaves of *A. scholaris* has been reported as used for skin disease in India, and the sap of some Fijian species as used by the natives for eye trouble. Examples of reports of various additional uses of *Alstonia* species follow: the Bakweli administer latex of *A. Boonei* to women to increase lactation and enrich their milk while suckling young; latex of *A. angustiloba* is used with copper sulfate for yaws, and that of *A. scholaris* is mixed with oil and used to treat earache; the leaf, root, and bark of *A. congensis* [or *A. Boonei*] are used externally in treating rheumatic pains.

In more modern times, the bark of *A. scholaris* has been regarded as a remedy of considerable promise in debility after fevers and other exhausting diseases. Rakshit (1944) wrote that the total alkaloids obtained by his method of extraction possessed definite antimalarial constituents. This investigator suggested that the negative tests obtained by others were the result of inadequate methods of extraction which did not dissolve out the proper alkaloids.

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The use of *Alstonia* as an antiplasmodial is frowned upon, but the antipyretic effectiveness of *A. scholaris* has apparently been substantiated by recent findings such as those of B. Mukerji (1946), who states that he has observed febrifugal action of a pronounced degree.

Many alkaloids have been isolated from *Alstonia* bark. Henry (1939) lists 11 species as having been examined for alkaloids, all with positive findings. Not one of the species listed belongs in the § *Blaberopus,* or the § *Winchia.* The latter, with its single species, is closely related to § *Pala,* but § *Blaberopus* is highly distinctive and certainly merits careful investigation. In the § *Dissuraspermum* only *A. constricta* was examined, a species hardly typical of the section. Henry lists *A. somersetensis* and *A. spectabilis.* The identity of these species is not clear. The former might be either *A. spectabilis* or *A. Muelleriana,* the latter, *A. scholaris.*

While *Alstonia* alkaloids occupy an important place in chemical literature, much less is known about the value of the latices. The widely distributed *A. scholaris,* the very closely related African representatives, and also other species are immense trees bearing copious latex of good quality for use as chewing gum. The latex of *A. angustiloba* is reported to have been analyzed and found similar to that of *Dyera* (Anonymous, 1910) and it has been noted that the latex of *A. angustifolia* solidifies to something like jelutong. Marx Lang (1925: 11) states that *A. Vieillardi* "pourrait devenir facilement l'objet d'une culture intéressante, car il a donné, a la saignée, les 7/10 des son volume en caoutchouc." The latex obtained from the branchlets and petioles of *A. vitiensis* and related species is used by the Fijians as a source of chewing gum. A sample of caoutchouc prepared from a Fijian *Alstonia* was sent to England and the quality was highly valued (Morris, 1898: 48).

The wood of *A. spatulata* is among the lightest known. The timber of *A. scholaris* is used in a minor way for boxes, furniture, and like articles. The wood of *A. scholaris* is not durable and that of *A. Boonei* is subject to insect attack and decay; they possibly are suitable for paper pulp.

The potential commercial possibilities of *Alstonia* pose the question of availability of large quantities of plant material. The natural range of *Alstonia* is an immense, almost continuous belt in the palaeotropics, stretching from the west coast of Africa to the Marquesas in the far eastern Pacific, and from the Himalayas to New South Wales. Species grow at altitudes and under conditions varying from sea level to very great heights, in deep swamps and rain forests to rather dry ground and areas of moderate rainfall, in soils of rich humus to clay or limestone. Although *Alstonia* species apparently do not form exclusive stands in virgin forests, great numbers of individuals are sometimes found in certain localities. In distributional character, therefore, *Alstonia* has an advantage over its sister genus, *Dyera,* the well-known producer of jelutong; also in the diversity of its taxonomic elements, embracing 5 sections, 39 species, 12 varieties, and countless forms, *Alstonia* enjoys an advantage over *Dyera,* which comprises merely two closely related species (Monachino, 1946: 189).

Continuing on the subject of availability, what promise has *Alstonia* as a cultivated crop? Several attempts have been made in the cultivation of *Dyera,* but without conclusive results (Monachino, 1946: 178–180). No extensive experiment has been reported on the cultivation of *Alstonia,* but *A. scholaris,* as an ornamental, has proved quite adaptable in climates such as southern Florida and California in the United States, Puerto Rico and Dominica in the West Indies, Calcutta in India, and Buitenzorg in Java. Duss (1897: 397) noted that *A. scholaris* grown in the botanic garden at Saint-Pierre, Guadeloupe, covered itself with flowers in October or November but did not produce fruits.

Literature: No work of monographic character on the genus *Alstonia* has hitherto been attempted. Taxonomic treatments have been of a local nature and are found principally in regional or general floras. An example of such treatments is Hooker's flora of British India (1882: 630, 641–643). The species of the Malay Peninsula are presented in excellent style in King and Gamble's flora of the Malay Peninsula (1907). Four of these species are also described by Pitard in Le Comte's *Flore Générale de l'Indo-Chine* (1933: 1161–1166). Comments on certain species from China appear in Tsiang's *Notes on the Asiatic Apocynales* (1934, 1936). Koorders and Valeton's *Bijdrage No. 1 tot de Kennis der Boomsoorten van Java* (1894: 115–125) and Miquel's *Flora Indiae Batavae* (1856: 436–440) refer to species of *Alstonia* in Java. The species found in New Guinea are interpreted by Markgraf (1927). Bentham's *Flora Australiensis* (1869: 312–315) deals with the Australian representatives of *Alstonia.* There is no single taxonomic treatment of all the species known from New Caledonia, but 11 are cited by Spencer Moore (1921: 362–364) of which five are described as new. Guillaumin (1911*a*: 195–196) cites 13 species and Schlechter (1906: 235–237) cites seven species. The account of *Alstonia* in Samoa given by Christophersen (1935: 177–180) and other reports, by various authors, on the genus in the Pacific islands or in Africa are of importance only for individual species.

Of works other than taxonomic, J. K. Santos' *Histological Study of the Bark of* Alstonia scholaris *R. Brown from the Philippines* is of particular interest. H. H. Janssonius (1926: 610–626) treats the wood anatomy of *A. scholaris, A. spectabilis, A. angustiloba,* and *A. spatulata* and presents a key to these species based on wood structure (1925: 576). The lightweight wood of *A. spatulata* is discussed by E. Graffe (1934).

Chemical and physiological studies of extracts of *A. scholaris* are presented by R. F. Bacon (1906: 1008–1019). Here references are made to earlier workers who have investigated *Alstonia* for its therapeutic and chemical properties. Noteworthy among these are Jobst and Hesse, Gorup-Besanez, Gruppe, and Harnack. The first four of these authors are cited by Santos, who, in addition, cites Dymock and Flückiger and Hambury.

Recently, Pichon (1947) wrote a very interesting paper on *Alstonia.* His article is discussed in the Supplement following the body of the present treatise. Pichon suggested that the Central American–Mexican *Tonduzia* is truly an *Alstonia.* The seeds of *Tonduzia,* however, are not ciliate as in *Alstonia* but finely membranously lacerate along the margins.

System of arrangement of material: In the taxonomic portion of this paper, the key to the sections, diagnoses of the sections, and the keys to all the species and varieties immediately follow the description and discussion of the genus. Secondary sectional characters are given in the body of the paper preceding the treatment of the individual species belonging to the section. For full characterization of each species it is necessary to read the individual description, and also the secondary sectional generalizations heading the group, as well as the original diagnosis of the section.

In the treatment of the species reference is made only to those illustrations which were available and, in the writer's opinion, significant; a complete survey of illustrations or of the bibliography was not attempted. Not all specimens examined in the well-represented species are cited.

In order to save space, the citation of herbaria is generally limited in the following fashion: If the specimen is deposited at the New York Botanical Garden no indication is made of herbaria where it is deposited. If the collection is not represented here but is represented at the Arnold Arboretum, then that institution is cited exclusively. If not in either the Arnold Arboretum or the New York Botanical Garden but present in the Gray Herbarium the latter only is cited. If not in any

of the above three herbaria, then complete citation is made; also complete references to herbaria are given in special cases.

Abbreviation of herbaria: The depositories of the specimens examined are abbreviated as proposed in *Chronica Botanica* (Lanjouw, 1939), where complete names and addresses of the herbaria are given, arranged in alphabetic sequence according to city in which they are located. The following abbreviations appear in this paper: A (Jamaica Plain), Bish (Honolulu), BM (London), Br (Bruxelles), Bri (Brisbane), Cal (Calcutta), F (Chicago), Fi (Firenze), G (Genève), GH (Cambridge), K (Kew), L (Leiden), Min (Minneapolis), Mo (St. Louis), NY (New York), P (Paris), Sing (Singapore), UC (Berkeley), US (Washington).

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DISCUSSION

Two new sections of the genus *Alstonia* are proposed in the present paper. One is based on the genus *Winchia* and consists, at present, of but a single species, including in its synonymy *A. pachycarpa* and *A. rostrata.* The section *Winchia* has syncarpous ovaries and connate follicles, features not previously recognized in *Alstonia.* The other new section embraces species which have hitherto been incorporated in § *Dissuraspermum.* Seed morphology is stressed as being of sectional importance.

It is not surprising that only one new species (*Alstonia Brassii*) is described, for in a genus consisting of conspicuous, greatly polymorphic species superfluous names are usually freely published until a comprehensive treatment is rendered.

Study has forced a disposition of the well-known *A. villosa* in synonymy under the neglected but prior *A. spectabilis. A. congensis* is identified with *A. Gilletii;* consequently the greater part of the material hitherto distributed as *A. congensis* is now referred to *A. Boonei. Blaberopus Sebusi,* long since buried and forgotten as merely a mixture of *A. venenata* and *A. neriifolia,* is resurrected as a legitimate species of *Alstonia,* with the description of a variety adduced as supporting evidence of its integrity. *A. Muelleriana* is reinstated. Several other novel interpretations, sometimes radically divergent from those currently accepted, have been necessary.

Eight new varieties[2] are introduced in the present work. This is partly a reflection of the polymorphic nature of *Alstonia;* these varieties often serve as convenient intermediates between species that are clearly distinct only in their typical forms.

I am not completely satisfied with my treatment of several problems in *Alstonia.* No authenticated specimens of *A. spectabilis,* which is one of the three basic species founded at the same time as the genus, were available. It is here designated as type of a new section and interpreted as widespread in the Malay Archipelago. Neither types nor authenticated material of *A. glabriflora* and *A. Kurzii* were seen.

In § *Blaberopus,* I have a somewhat uneasy feeling concerning the great distributional gap shown by *A. neriifolia,* which is known from sub-Himalayan India and apparently appears also in Java.

Most disturbing are several cardinal problems still unsolved concerning the species of *Alstonia* in the Pacific. *A. plumosa* was not identified; this, being the second *Alstonia* described from the area, has involved species both in New Caledonia and in the more eastern Pacific islands. No specimen of *A. Godeffroyi* was identified, and one may wonder whether the

[2] No use is made of trinomials with the formal designation "var. *typica,*" etc., for the nomenclaturally typical element.

later *A. Reineckeana* is not truly synonymous with this. Aside from the nomenclatural difficulties, there is suspicion of the criteria employed by me for taxonomic evaluation of morphological characters observed in the baffling *plumosa–costata* species complex. Only photographs of *A. Comptonii* and *A. saligna* were examined. The fruits of *A. quaternata* were not available, and since the plant is unique in several features there is uncertainty about its sectional, and possibly its generic, status.

Genus *ALSTONIA* Brown

Alstonia R. Br., in Mem. Wern. Soc. 1: 75. 1811 (nom. conserv.). Non Scop., Introd. Hist. Nat. 198. 1777; non Mutis ex L. f., Suppl. 39. 1781.

Pala Adr. Juss., in Ann. Mus. Paris 15: 346. 1810.

Blaberopus A. DC., Prod. 8: 410. 1844.

Winchia A. DC., Prod. 8: 326. 1844.

Amblyocalyx Benth., in Benth. and Hook., Gen. Pl. 2: 698. 1876.

Paladelpha Pichon, in Paris Mus. d'Hist. Nat., Bul. II, 19: 299. 1947.

Laticiferous trees or shrubs. Leaves verticillate or opposite, penninerved, the lateral nerves (principal secondaries) varying from very numerous and close to few and distant, 1–30 mm. apart (the average distance apart near middle of blade). Calyx without glands, the tube very short, the lobes 5; inflorescences apparently terminal, the primary peduncles usually several, more or less branched, the flowers cymose, white to yellow or red; corolla tube cylindric, slightly inflated at region of anthers, thickened at throat, pubescent within below stamens and more sparsely so or glabrous above, or densely barbate at throat in § *Blaberopus;* corolla lobes spreading at maturity, more or less barbate at base within; anthers on short but distinct filaments, dehiscent their entire lengths or only for the greater part (spp. in § *Pala*), without appendages; ovary apocarpous or syncarpous in § *Winchia* (? *A. quaternata*), superior or partly inferior, ovules numerous, in many ranks or rarely in two or three ranks in each cell; style long and filiform to very short, glabrous; stigma reaching up to anthers, the stigma-apiculi short, papillose, the clavuncle cylindric, often variably penicillate above, membranous indusiate above and tunicate below; follicles separate or united into a single capsule (§ *Winchia*), rather slender, lightly striate outside. Seeds numerous, very light, thin and flattened, ciliate, the surface minutely foveolate, the placental scar at about middle, the embryo about length of seed-body, the cotyledons about length of radicle, broadly elliptic to narrowly oblong or linear.

Type species.—*A. scholaris* (L.) R. Br.

Alstonia R. Br. versus the two earlier homonyms by Mutis ex L. f. and Scopoli was proposed for conservation by Rehder (1935: 352) and conserved by the 6th International Botanical Congress, Amsterdam (1935).

Alstonia Scop. was based on *Pacouria* Aubl., a name now rejected in favor of *Landolphia* Beauv.

Alstonia Mutis ex L. f. is typified by *A. theaeformis*. The species was transferred to *Symplocos* by Gürke, and this disposition is accepted by Brand (1901: 81) in his monograph of the Symplocaceae.

Pala, rejected in favor of *Alstonia,* was based on "Pala" Rheede (1678: 81, t. 45), which is *A. scholaris*. It was published without a specific name and has never been adopted as a genus by any other author. The citation was followed by a very brief description but the identity of *Pala* with *Alstonia* is unquestionable. There is some doubt, however, whether Jussieu intended formally to propose *Pala* as a genus or wished merely to note that the plant designated as "Pala" by Rheede in 1678 should merit generic distinction.

Of the five sections in *Alstonia, Blaberopus* has most to recommend it for recognition as a distinct genus but is here considered fairly well within the generic latitude of *Alstonia.* A. Gray

implied that his subgenus *Dissuraspermum* might be wholly detached from *Alstonia* with better reason than *Blaberopus* had been.

The character of syncarpous ovary and united follicles found in *Winchia* are in themselves not of sufficient importance to maintain a distinct genus. There is experience in another genus of Apocynaceae, *Wrightia,* in which the character of connate follicles in certain species is of minor significance and cannot serve to segregate them generically from other species having widely divergent follicles. The close relationship between § *Winchia* and § *Pala* is very marked.

Amblyocalyx owes its origin to an erroneous observation of the ovary of a specimen of *A. angustifolia,* in which the ovule masses were mistaken for single ovules. It was originally published without a specific name: "Species I (v. 2?) Borneensis, *Beccari 1628* et *3207.*" Subsequently it was typified by *1628, Amblyocalyx Beccarii.*

The genus *Alstonia* is amply distinct, its only close relative being *Dyera.* The § *Pala* is closest to *Dyera.* Besides its habit and vegetative similarity, the dehiscence of the anthers in some of the species in this section indicates affinity.

The form of ciliation in the seeds of *Alstonia* is almost unique in the Apocynaceae. A similar ciliation is found in *Laxoplumeria,* a South American genus of trees having alternate leaves. The seeds of *Alstonia* are invested with cilia at both ends, the distinct hairs being in some species sparsely distributed and in others rather densely set, but at no time truly comose as in *Holorrhena* and *Wrightia,* for example, or in other apocynaceous genera.

There is no easy way of distinguishing *Alstonia* from some other genera. *Rauvolfia, Tabernaemontana,* and *Ochrosia* have been frequently confused with *Alstonia.* With the examination of the seeds no such confusion could be possible. If the plant is a tree or shrub with verticillate or opposite leaves, and its seeds are ciliate, it is an *Alstonia.* Given seeds, not only the genus but also the section can almost always be determined; without seeds, the assigning of an unfamiliar species to *Alstonia* would be a very difficult task.

The distribution of native species of *Alstonia* in the major land groups of its range is as follows:

Africa—*Boonei, congensis*

India—*neriifolia, scholaris, Sebusi, venenata*

Burma to China—*angustifolia, glaucescens, macrophylla, Mairei, scholaris, Sebusi, spatulata, venenata, yunnanensis*

Malayan Peninsula and Archipelago (Malaysia)—*angustifolia, angustiloba, Curtisii, glaucescens, macrophylla, neriifolia, parvifolia* (Borneo ?), *pneumatophora, rupestris, scholaris, spatulata, spectabilis*

Philippines—*angustiloba, macrophylla, parvifolia, scholaris, spectabilis*

New Guinea—*actinophylla, Brassii, glabriflora, Muelleriana, scholaris, spectabilis*

Australia—*actinophylla, constricta, linearis, Muelleriana, ophioxyloides, scholaris, spectabilis*

Melanesia (excluding New Caledonia)—*scholaris, spectabilis, vitiensis*

New Caledonia—*Comptonii, Deplanchei, lanceolata, Legouixiae, Lenormandi, plumosa, quaternata, Roeperi, saligna, Vieillardi*

Fiji and eastern Pacific islands—*costata, Godeffroyi, montana, Reineckeana, vitiensis*

Key to the Sections of *Alstonia*

1. Corolla lobes with left margins overlapping; seeds not acuminate or caudate; stamens inserted manifestly above middle of corolla tube, located at or near throat; leaves 3- to 11-verticillate, lateral nerves close and numerous 2
   Corolla lobes with right margins overlapping; seeds acuminate or acute at one or both ends..... 4

2(1). Disc annular or not apparent, not lobed; seeds with thick rounded margins at ends; leaves rounded to acuminate but not finely pointed at apex; large trees 3
   Disc with two conspicuous deltoid to linear lobes; seeds with thin, often

erose margins at ends; leaves finely pointed at the acuminate apex; small shrubs; anthers over 1.4 mm. long ..... *Blaberopus*

3(2). Follicles connate into a single thick capsule ..... *Winchia*

Follicles divergent, slender..... *Pala*

4(1). Seeds rounded to subacute at one end and acute to caudate at the other, densely ciliate at ends with long coma-like hairs; leaves 3- to 4-verticillate, lateral nerves distant, reticulation manifest ..... *Monuraspermum*

Seeds manifestly narrowed-acute to long slender caudate at both ends, cilia short, not coma-like; leaves opposite, or rarely both opposite and 3-verticillate ..... *Dissuraspermum*

Section WINCHIA (A. DC.) Monachino, stat. nov.

Winchia A. DC., Prod. 8: 326. 1844.

Like § *Pala* but ovary syncarpous and follicles united into a single thick capsule; leaves less pale beneath than in § *Pala.* Known at present from a single species. Trees; leaves 3- to 4-verticillate, green on both sides or slightly paler beneath, the lateral nerves numerous, close, parallel, straight or slightly arcuate, horizontal or a little ascending; corolla lobes with left margins overlapping; anthers located at throat of corolla, the filaments attached manifestly above middle of corolla tube; ovary syncarpous, disc not conspicuous; follicles united into a single thick capsule; seeds oblong, rounded at both ends, margins thick, glabrous on faces, long-ciliate at ends; placental scars linear.

Type species.—*A. glaucescens* (K. Schum.) Monachino.

Section PALA (Adr. Juss.) Benth., in Benth. and Hook., Gen. Pl. 2: 705. 1876.

Pala Adr. Juss., in Ann. Mus. Paris 15: 346. 1810.

Subgen. *Pala* King & Gamble, in Jour. As. Soc. Beng. 74(2): 435. 1907 (*in clavis*).

Series *Glabrae* Pichon, in Paris Mus. d'Hist. Nat. Bul. II, 19: 296. 1947.

Series *Pilosae* Pichon, in Paris Mus. d'Hist. Nat. Bul. II, 19: 296. 1947.

Trees. Leaves 3- to 11-verticillate, undersides pale to strongly cinereous, habitually with microscopic papillae, the lateral nerves numerous, close, parallel, straight or slightly arcuate, horizontal or a little ascending. Corolla lobes with left margins overlapping; anthers located at throat of corolla, the filaments attached manifestly above middle of corolla tube; ovary apocarpous, disc not conspicuous. Seeds oblong, rounded at both ends, margins thick, glabrous on faces, long-ciliate at ends; placental scar linear.

Type species.—In proposing this section, Bentham (1876) cited the genus *Pala* in synonymy and referred to the illustrations Wight Ic. t. 422 and Bedd. Fl. Sylv. t. 242. These illustrations are of *A. scholaris,* and the Jussien *Pala* was also based on the same species. The type of section *Pala* is therefore *A. scholaris* (L.) R. Br.

Key to Section *Pala*

1. Corolla pubescent outside; leaves generally broadest above middle, the transverse veins and reticulation prominulous on upper surface..... 2

Corolla glabrous outside..... 5

2(1). Inflorescence with flowers in very closely crowded cymes, pedicels up to 3 mm. long; calyx densely tomentose outside; corolla lobes quadrate-orbicular, 2.0 to 4.5 mm. long and as broad. Plants not of Africa..... 3

Inflorescence with flowers more loosely disposed; pedicels to 6 or 8 mm. long. Africa 4

3(2). Leaves glabrous..2. *A. scholaris* (typical)

Leaves softly villose on underside..... .....2a. *A. scholaris* var. *velutina*

4(2). Calyx densely tomentose outside; ovary densely pubescent; typical corolla tube 6 to 12 mm. long, corolla lobes 3 to 6 mm. long, about as broad as long; follicles tomentose; leaves petioled, petioles 1 to 2 cm. long..... .....3. *A. Boonei*

Calyx glabrous or sparsely pubescent outside; ovary glabrous or nearly so; typical corolla tube 4 to 6 mm. long, corolla lobes 5 to 9 mm. long, much longer than broad; follicles glabrous; leaves sessile or almost so, petioles less than 0.5 cm. long....4. *A. congensis*

5(1). Leaf blades markedly spatulate, rounded at apex, principal lateral nerves 20 to 35 pairs. Malaya..... 6
Leaf blades elliptic, narrowed or acuminate at apex..... 8
6(5). Inflorescence loosely cymose, sparsely flowered, glabrous; pedicels long, up to 13 mm. long; corolla lobes large, 7 to 12 mm. long, 4 to 5 mm. broad; follicles glabrous.....7. *A. spatulata*
Inflorescence with numerous flowers very closely crowded, puberulent; pedicels very short, up to 3 mm. long; corolla lobes 3 to 5 mm. long, about 2 mm. broad, follicles puberulent..... 7
7(6). Petioles 0 to 0.7 cm. long.....6. *A. pneumatophora* (typical)
Petioles about 2 cm. long.....6a. *A. pneumatophora* var. *petiolata*
8(5). Inflorescence in rather closely flowered cymes, puberulent; calyx lobes puberulent outside; leaf blades 3 to 7 cm. broad, principal lateral nerves 40 to 100 pairs. Malaya.....5. *A. angustiloba*
Inflorescence in loose cymes, glabrous; calyx lobes glabrous outside; leaf blades narrow, 1 to 3 cm. broad, principal lateral nerves 35 to 50 pairs. Australia–New Guinea.....8. *A. actinophylla*

Section BLABEROPUS (A. DC.) Benth., in Benth. and Hook., Gen. Pl. 2: 705. 1876.
Blaberopus A. DC., Prod. 8: 410. 1844.
Subgen. *Blaberopus* King and Gamble, in Jour. As. Soc. Beng. 74(2): 435. 1907 (*in clavis*).

Shrubs, sometimes dwarf; leaves 3- to 6-verticillate, acuminate and finely pointed at apex, not markedly pale beneath, not microscopically papillose, the lateral nerves numerous, close, finely raised-striate on upper surface, lightly arcuate, joined by a fine marginal nerve, the transverse veins hardly showing; corolla tube densely bearded with moniliform hairs at throat; corolla lobes with left margins overlapping; anthers located at throat of corolla (below the throat in *A. Curtisii*), comparatively large (over 1.4 mm. long), the pollen grains much larger than in other sections (about twice as large or 45–60μ), the filaments attached manifestly above middle of corolla tube; ovary apocarpous, the disc manifest, with two conspicuous lobes opposite sutures of ovary; seeds a little narrowed but not acuminate at ends, long-ciliate at ends and often truncate-erose, faintly membranous-margined particularly at ends, sparsely pubescent on faces; placental scar short.

Type species.—In proposing this section Bentham (1876) cited the genus *Blaberopus* A. DC. in synonymy and referred to the illustrations Wight Ic. t. 436 and Lodd. Bot. Cab. t. 1180. These illustrations are of *A. venenata*, which is the earliest species representing *Blaberopus*. The type of § *Blaberopus* is therefore *A. venenata* R. Br.

Key to Section *Blaberopus*

1. Calyx lobes ciliate..... 2
Calyx lobes not ciliate, not acuminate; follicles not stipitate; leaves 5 to 12 cm. long, glabrous..... 8
2(1). Calyx lobes greatly attenuate and finely acute at apex; leaves sessile or almost so, hispidulous beneath or at least scabridulous on midrib; corolla lobes 3 to 6 mm. long, ciliate; corolla tube about 1 cm. long; follicles not stipitate.....15. *A. yunnanensis*
Calyx lobes not acuminate; leaves manifestly petioled; corolla lobes not ciliate..... 3
3(2). Follicles with slender stipes (stipes 1.5 to 3.0 cm. long), somewhat fusiform, 6 to 13 cm. long, 6 to 7 mm. diameter..... 4
Follicles not stipitate, slender cylindric, 10 to 14 cm. long, 3 to 4 mm. diameter; corolla lobes 6 to 18 mm. long.. 7
4(3). Corolla lobes short, 2 to 3 mm. long; corolla tube about 1 cm. long; stigma-apiculi long and sharp..... 5
Corolla lobes long, 12 to 20 mm. long; corolla tube 2 to 3 cm. long; stigma-apiculi short and blunt..... 6
5(4). Leaves beneath and inflorescence pubescent with short spreading hairs. Himalaya.....11. *A. Sebusi* (typical)
Leaves and inflorescence glabrous. Yunnan.....11a. *A. Sebusi* var. *szemaoensis*
6(4). Leaves and inflorescence glabrous.....9. *A. venenata* (typical)
Leaves beneath and inflorescence pubescent with short spreading hairs.....9a. *A. venenata* var. *pubescens*

7(3). Leaves sericeous-pubescent beneath.... .....10. *A. neriifolia* (typical)
Leaves glabrous ....10a. *A. neriifolia* var. *glabra*
8(1). Corolla lobes long, about 9 mm. long, corolla tube about 2 cm. or more long; petioles about 1 cm. long; lobes of gland much narrower than ovary; anthers over 2 mm. long..... 9
Corolla lobes short, about 2.5 mm. long, corolla tube about 1 cm. long; leaves sessile; lobes of gland almost as broad and long as ovary; anthers about 1.5 mm. long.....14. *A. rupestris*
9(8). Corolla tube inflated at throat, about 2 cm. long; anthers located at throat, their apices almost reaching bases of corolla lobes.....12. *A. Mairei*
Corolla tube conspicuously constricted at throat for a length of about 5 to 6 mm. below mouth, inflated at about ¼ of its distance from mouth, about 2.5 to 3 cm. long; anthers located below throat, their apices being about 6 mm. from corolla lobes..... .....13. *A. Curtisii*

Section MONURASPERMUM Monachino, sect. nov.

Sect. *Dissuraspermum* Benth., ser. *Occidentales* Pichon, in Paris Mus. d'Hist. Nat. Bul. II, 19: 297. 1947 (pro part.).

Arbores foliis 3- vel 4-verticillatis; venis secundariis foliorum distantibus arcuatis; lobis corollae marginibus dextris imbricatis; disco annulare et angusto vel obscuro; seminibus ad cacumen aliud rotundatis usque ad subacutis, ad cacumen aliud acutis usque ad acuminatis, cacuminibus comoso-ciliatis.

Trees. Leaves 3- or 4-verticillate, not microscopically papillose beneath, the principal lateral nerves distant, arcuate near margin and connected by a faint looping marginal nerve, the anastomosing veins and close reticulation manifest; corolla lobes with right margin overlapping; disc annular, very narrow or not apparent; follicles separate; seeds elliptic, rounded to obtuse or sometimes subacute at one end, acute to acuminate or caudate at the other, tails not forked, faces densely pubescent, ends long-ciliate with coma-like hairs, sides short-ciliate to glabrous; placental scar short.

Type species of the section.—*A. spectabilis* R. Br.

Schumann, in Engler and Prantl (1895: 139), included species belonging in the present section under § *Dissuraspermum;* King and Gamble (1907: 435), in key, did likewise under the subgenus *Dissuraspermum.* The two sections are without doubt closely related.

Key to Section *Monuraspermum*

1. Leaves narrowly linear, about 7 cm. long and only 1.5 to 3 mm. broad, the lateral nerves about 40 pairs, 1 mm. apart.....24. *A. linearis*
Leaves not linear, more than 2 cm. broad, the lateral nerves less than 30 pairs, more than 2 mm. apart.... 2
2(1). Calyx densely gray or rusty-tomentose outside; pedicels not long and slender; corolla lobes not ciliate or hardly so; corolla tube mostly tomentose outside 3
Calyx puberulent to glabrous, not tomentose outside; corolla tube glabrous outside; corolla lobes mostly ciliate 9
3(2). Lobes of calyx densely pubescent inside as well as outside, their margins thick; stamens inserted near middle of corolla tubes..... 4
Lobes of calyx glabrous inside or sparsely pubescent near apex, their margins thin; stamens inserted near throat of corolla tube; corolla lobes broadly rounded or ovate, densely pubescent outside and inside; inflorescent branches and pedicels ascending 8
4(3). Calyx urceolate, the lobes broadly ovate, mostly reflexed; inflorescent branches and pedicels divaricate.... 5
Calyx turbinate, the lobes ovate to lanceolate, not reflexed; inflorescent branches and pedicels ascending; corolla densely pubescent outside, corolla lobes linear- or oblong-lanceolate, about 3 or 4 times as long as broad. Australia and Papua.....20. *A. Muelleriana*
5(4). Corolla lobes broadly rounded, less than 3 mm. long and about as

broad, densely pubescent outside and inside; calyx about 2 mm. or less long; corolla tube densely tomentose outside. Malaya..... 6
Corolla lobes oblong, about 3 mm. or more long and about half as broad, glabrous or slightly puberulent outside and sparsely pubescent inside; calyx over 2 mm. long; corolla tube mostly glabrous or sparsely pubescent outside. Philippines and Borneo....17. *A. parvifolia*

6(5). Petioles mostly 1 to 2 cm. long, blades 2 to 6 cm. broad; calyx lobes mostly spreading; corolla tube 2.3 to 3.5 mm. long; anthers 0.6 to 1 mm. long..... 7
Petioles 2.5 cm. long, blades 6.5 to 8 cm. broad; calyx lobes hardly spreading, sharper at apex than in the typical form; corolla tube 4.5 to 5.5 mm. long; anthers 1 to 1.3 mm. long.....16b. *A. angustifolia* var. *latifolia*

7(6). Corolla tube 3 to 3.5 mm. long, corolla lobes broadly oblong-ovate; calyx tube about 1.2 to 1.3 mm. long.....16. *A. angustifolia* (typical)
Corolla tube 2.3 to 2.6 mm. long, corolla lobes more oblong in shape, less densely pubescent outside; calyx tube almost lacking, calyx lobes less reflexed, sharper at apex ..16a. *A. angustifolia* var. *annamensis*

8(3). Leaves with principal lateral nerves close, averaging 3 to 6 mm. apart near middle of blade. Australia.....19. *A. ophioxyloides*
Leaves with principal lateral nerves more distant, averaging 6 to 12 mm. apart. Java to Australia and elsewhere.....18. *A. spectabilis*

9(2). Corolla lobes ligulate, 3.5 to 7 mm. long and less than half as broad, about as long as corolla tube.....10
Corolla lobes oval, 2 mm. long and half as broad, ⅔ as long as corolla tube, ciliate only at base; leaves glabrous. New Guinea. (Not seen.).....23. *A. glabriflora*

10(9). Pedicels comparatively long and slender, up to 4 mm. long; calyx less than 1.5 mm. long, the lobes about 1 mm. or less long, gray-puberulent or glabrous outside; stamens inserted near throat of corolla tube; leaves pubescent or glabrous beneath. Philippines to Malaya 11
Pedicels short and stouter, less than 3 mm. long; calyx about 2 mm. long, the lobes over 1.5 mm. long, glabrous or nearly so outside; stamens inserted near middle of corolla tube; leaves glabrous. New Guinea.....22. *A. Brassii*

11(10). Calyx lobes usually less than 1 mm. long, puberulent as well as ciliate; anthers about 0.9 mm. long.....21. *A. macrophylla* (typical)
Calyx lobes usually more than 1 mm. long, ciliate, otherwise glabrous, sharper at apex; anthers about 1.1 mm. long. Amboina and Ceram.....21a. *A. macrophylla* var. *acuminata*

Section DISSURASPERMUM (A. Gray) Benth., in Benth. and Hook., Gen. Pl. 2: 705. 1876.

Subgen. *Dissuraspermum* A. Gray, in Proc. Amer. Acad. 5: 334. 1862.

Series *Orientales* Pichon, in Paris Mus. d'Hist. Nat., Bul. II, 19: 298. 1947.

Small trees or shrubs. Leaves opposite, rarely also 3-verticillate, lateral nerves distant or close, reticulation manifest or obscure. Corolla lobes with right margins overlapping; disc not apparent. Follicles separate; seeds elliptic, usually caudate at both ends, sometimes merely acuminate; tails often forked, faces pubescent, margins and tails short-ciliate with hairs more or less equal in length, not comose-ciliate; placental scar short.

Type species.—Gray furnished an adequate description of this group and cited as representative species, *A. costata* and *A. plumosa.* The older species, *A. costata* (Forst. f.) R. Br., is proposed as the type of the section.

Key to Section *Dissuraspermum*

1. Calyx lobes manifestly ciliate; seeds lanceolate, 7 to 12 mm. long, hardly caudate. Plants of Australia ..... 25. *A. constricta*
Calyx lobes not ciliate. Plants not of Australia 2

2(1). Corolla lobes manifestly ciliate; inflorescence very sparsely and loosely flowered; leaves with numerous lateral nerves (about 40 pairs); seeds about 16 mm. long, slender-caudate at both ends. New Caledonia.....26. *A. lanceolata*

Corolla lobes not ciliate or very obscurely and sparsely so..... 3

3(2). Corolla tube minutely puberulent outside near middle, 8 to 9 mm. long, corolla lobes shorter than tube; inflorescence with branchlets and pedicels adpressed or ascending; leaf blades 9 to 36 cm. long and 4 to 22 cm. broad, dull on upper surface, not retuse at apex; seeds 7 to 9 mm. long, the tails short, less than 2 mm. long. New Caledonia.....27. *A. Vieillardi*

Corolla tube glabrous outside, less than 7 mm. long..... 4

4(3). Inflorescence strongly divaricate, lax; corolla tube 2 to 3 mm. long; leaves with about 30 or more pairs of lateral nerves. New Caledonia. (Species not seen.)..... 5

Inflorescent branches divaricate to erect; combination of characters not as above. Species difficult to distinguish; best recognized by combination of many characters. (Species seen, except *A. plumosa.*) 6

5(4). Leaf blades linear-lanceolate, 5 to 9 cm. long and 0.5 to 0.8 cm. broad; branches slender. (Not seen.)..... .....37. *A. saligna*

Leaf blades oblong-oblanceolate, 12 to 25 cm. long and 3 to 6 cm. broad. (Not seen.)..... .....38. *A. Comptonii*

6(4). Seeds 12 to 24 mm. long, slender-caudate at both ends, tails long, 4 to 9 mm. long, fork distant from body of seed; principal lateral nerves up to 25 pairs..... 7

Seeds 4 to 12 mm. long, short-caudate, tails 1 to 4 mm. long, forked near body of seed; leaves glabrous 11

7(6). Leaf blades 2.5 to 11 cm. long and 1.2 to 3.5 cm. broad, rounded to somewhat acute at apex; corolla lobes oblong, pubescent the entire surface within; follicles 7 to 13 cm. long; seeds 24 mm. long. New Caledonia. (Not seen.)..... .....29. *A. plumosa*

Leaf blades larger or seeds shorter..... 8

8(7). Leaf blades 14 to 28 cm. long and 3 to 15 cm. broad, usually acuminate at apex, glossy above, lateral nerves 16 to 25 pairs; corolla lobes oblong-lanceolate; follicles up to 22 mm. long. Plants of New Caledonia.....28. *A. Roeperi*

Leaf blades dull to somewhat shining above, lateral nerves 10 to 17 pairs; corolla lobes linear-lanceolate. Plants not of New Caledonia 9

9(8). Branchlets usually very stout, petioles 2.5 to 9 cm. long, usually conspicuously fossate at axil; leaf blades often very large (6-) 8 to 45 cm. long and 4 to 27 cm. broad, lateral nerves (10-) 12 to 16 pairs 10

Branchlets not stout; petioles 1.5 to 3 cm. long, not conspicuously fossate at axil; leaf blades usually 7 to 20 cm. long and 3 to 9 cm. broad, glabrous or rarely villose beneath, lateral nerves usually 10 to 13 pairs. Transitional species .....31. *A. Reineckeana*

10(9). Leaf blades elliptic, usually rounded to short-acuminate at apex and rather obtuse at base; corolla tube 2.2 to 4.4 mm. long. Solomon Islands to Fiji and Samoa..... .....30. *A. vitiensis* (typical)

Leaf blades lanceolate, usually greatly narrowed at apex and base; corolla tube 2.2 to 3 mm. long. New Hebrides ....30a. *A. vitiensis* var. *novo-ebudica*

11(6). Leaf blades oblanceolate, about 3 to 4.5 cm. long and 1.2 cm. broad, retuse at apex, lateral nerves ascending, about 14 pairs; inflorescence short, sparsely flowered, branches rather erect; corolla tube about 6 mm. long, corolla lobes 2.5 mm. long, faintly pubescent outside; stamens inserted near base of corolla tube. New Caledonia..... .....34. *A. Deplanchei*

Leaf blades rounded to acuminate at apex, rarely slightly retuse; corolla tube 2 to 6 mm. long, corolla lobes glabrous outside 12

12(11). Leaves usually ternately verticillate as well as opposite, thickly coriaceous; petioles 0.5 to 1 cm. long; blades 5 to 7 cm. long and 1.2 cm. broad, lateral nerves obscure; inflorescence with ascending branches, flowers numerous and crowded. New Caledonia ..... 36. *A. Legouixiae*

Leaves opposite (never ternate?); inflorescent branches spreading 13

13(12). Lateral nerves of leaves straight, horizontal, 22 to 30 pairs; inflorescent branches filiform; calyx 0.7 to 1.4 mm. broad below lobes, the lobes 0.6 to 1 mm. long; anthers 0.7 to 0.8 mm. long. New Caledonia 14

Lateral nerves of leaves arcuate, 11 to 22 pairs; inflorescent branches usually stouter, calyx larger; anthers 0.9 to 1.6 mm. long. Fiji to Society Islands 16

14(13). Corolla lobes narrowly lanceolate to oblong-lanceolate, 2.8 to 5 mm. long and 0.8 to 1.3 mm. broad 15

Corolla lobes broadly ovate, 2.2 to 2.4 mm. long and 2.2 to 2.8 mm. broad ..... 35b. *A. Lenormandi* var. *lanceolifera*

15(14). Leaves chartaceous, rounded or slightly retuse at apex, the reticulation manifest ..... 35. *A. Lenormandi* (typical)

Leaves coriaceous, obtuse to slightly acuminate at apex, the reticulation obscure ..... 35a. *A. Lenormandi* var. *coriacea*

16(13). Leaf blades 5 to 15 cm. long and 2.5 to 6 cm. broad, usually obtuse or rounded at apex; inflorescence usually few-flowered; calyx lobes ovate, 0.9 to 1.6 mm. long; seeds 7 to 10 mm. long, tails 2 to 4 mm. long. Fiji and Samoa 17

Leaf blades 9 to 21 cm. long and 1.5 to 10 cm. broad, usually abruptly and sharply long-acuminate at apex; inflorescence usually many-flowered; calyx 1.2 to 2 mm. broad below lobes, the lobes ovate-lanceolate, 2 to 3 mm. long; seeds 4.5 to 7 mm. long, tails 1 to 3 mm. long. Society Islands and Marquesas ..... 33. *A. costata*

17(16). Calyx 1.4 to 2.6 mm. broad below lobes; inflorescence without filiform branches ..... 32. *A. montana* (typical)

Calyx 1 to 1.3 mm. broad below lobes; inflorescence with filiform spreading branches and pedicels .....32a. *A. montana* var. *filiformis*

Section not known

Corolla lobes with right margins overlapping; ovary characteristically ridged, style very short, ovules in two ranks in each cell; leaves 4-verticillate, petioles 2 to 4.5 cm. long, blades 8 to 16 cm. long, lateral nerves numerous (35 to 60 pairs) and close, reticulation not clear. New Caledonia ..... 39. *A. quaternata*

§ WINCHIA

This section is monotypic.

1. **Alstonia glaucescens** (K. Schum.) Monachino, comb. nov.

Alyxia ? calophylla Wall., Num. List. no. 1607. 1829. –nom. nud.[3]

Alyxia glaucescens G. Don, Gen. Sys. of Gard. 4: 97. 1837 (as to cit.); non. Wall. in Roxb., Fl. Ind. 2(ed. 1): 542. 1824.

Winchia calophylla A. DC., Prod. 8: 326. 1844.

Winchia glaucescens K. Schum., in Engl. and Prantl, Pflanzenf. 4(2): 125. 1895.

Alstonia rostrata C. E. C. Fischer, in Kew Bul. 1929: 315. 1929.

Alstonia pachycarpa Merrill and Chun, in Sunyatsenia 2: 98. 1934.

Trees up to 25 m. tall and 80 cm. in diameter. Leaves 3- or 4-verticillate, the petioles 1.5–3 cm. long, the blades elliptic, 9–13 (–20) cm. and 3–5 cm. broad, bluntly acuminate at apex, shining above, slightly paler beneath, not glau-

[3] There is some variance among authors in the precise usage of the designation *nomen nudum*. It is here used in its broadest definition, as suggested in the Index Analytique of the 1906 ed. of the International Rules: "noms publiés sans diagnose imprimée ou sans son équivalent." Merrill, A. C. Smith, Rehder, Pennell, Kobuski, and many others have referred to the well-typified names appearing in Wallich's Num. List as *nomina nuda*. Other botanists recommend that these names of Wallich be designated hyponyms, the term *nomen nudum* being reserved for mere names that appear without reference or any characterization whatsoever.

cescent-pallid, the margins involute, the lateral nerves 30–50 pairs, 2 mm. apart, the reticulation prominulous on both surfaces. Inflorescence in rather lax many-flowered cymes, glabrous, the peduncles short, 1.5–2 cm. long, the pedicels up to 3 mm. long, glabrous; calyx lobes ovate, 0.7–1.4 mm. long, glabrous or sparsely puberulent outside, adpressed pubescent inside, ciliate; corolla tube 5–6 mm. long, sparsely puberulent on upper part outside; corolla lobes broadly elliptic, 3–4 mm. long and about 2.5 mm. broad, puberulent outside, villose inside particularly toward base where densely bearded; anthers 1–1.5 mm. long, not dehiscing completely to base, located at throat of corolla, the filaments attached manifestly above middle of corolla tube; ovary partly inferior, rounded at apex, glabrous or faintly puberulent; stigma-apiculi about 0.5 mm. long. Capsule about 1 cm. in diameter; seeds 9 mm. long and 3 mm. broad, the cilia up to 2 cm. long.

TYPE.—Wall. Num. List. no. 1607, "Martabania 1827."

ILLUSTRATIONS.—DeLessert, Icon. Select. Pl. (1846) 5: t. 46 (as *Winchia calophylla*) leafy br. and infl., fl. analysis; Sunyatsenia (1935) 2: 310, fig. 42 (as *A. pachycarpa*) leafy br., fr.

DISTRIBUTION.—China, Burma, Sumatra; reported frequent or rare, from altitudes of 300–1100 m., in forests, woods, thickets, clay cliffs.

China—Yunnan: *C. W. Wang 75807, 77850, 75927, 79160 A* (fr.; A). Hainan: *S. K. Lau 1630* (Ka Chik Shan; fl.; NY, A), *27600* (Kumyun; fr.; A); *Chun and Tso 44317* (type coll. *A. pachycarpa;* A, K, NY, US).

Lower Burma—*Wallich 1607* (type coll. *Winchia calophylla;* NY); *C. E. Parkinson 6297* (Mergui, Victoria Point; fl.; K), *6563* (type coll. *A. rostrata;* K), *7684* (Mergui; fr.; K).

Sumatra—*Boschproefst. 5977* (Res. Sum. Westk. ond afd. Loeback Sikaping; L).

VERNACULAR NAMES.—*Dit Sz Mou* (Hainan), *Boelai Pipit* (Sumatra), *Taung-ma-yo* (Thaton).

In the selection of the proper specific epithet to be employed for the present species considerable differences in opinion were encountered. Therefore the reason for my choice is presented at length.

Alyxia glaucescens G. Don is associated with the present species only in Don's citation of Wall. List. 1607. Don's description and allocation ("straits of Malaca") identify his plant with Wallich's species from Penang, the *Alyxia glaucescens* in Roxburgh's *Flora,* which is not an *Alstonia.* Whether it be considered a later homonym or *nomen confusum,* or both, or a typographical error in accrediting the name to himself rather than to Wallich, *A. glaucescens* G. Don has no standing.

The specific epithet *calophylla* has been appropriated by Miquel for his *Alstonia calophylla,* a species placed in synonymy of *A. angustiloba* in the present paper.

Now the question arises whether *Winchia glaucescens,* which is the next name in order of priority, is legitimate. Schumann observed that since the name *Alyxia glaucescens* G. Don was cited by De Candolle in synonymy of *Winchia calophylla* A. DC., the earlier specific epithet should be used; he apparently considered his name a new combination in which use was made of Don's epithet, and he accredited G. Don parenthetically. Actually De Candolle had noted that *A. glaucescens* G. Don differed from his plant in some important characters but referred to it primarily because of Don's citation of *Wall. 1607.* However, Schumann's description of the Martaban plant and his placing of *Winchia calophylla* in synonymy leave no doubt regarding what species he had in mind. Schumann erred merely in considering Don's specific epithet as being necessary for a new combination, for it was illegitimate and therefore not to be taken into consideration for the purpose of priority. The question is whether Schumann could legitimately make use of *glaucescens.* The answer is yes; for the International Rules (Ed. 3, 1935. Article 69) concede as proper for the formation of a new name the employment of an epithet that has been illegitimately

published: "Where a new epithet is required, an author may, if he wishes, adopt an epithet previously given to the group in an illegitimate combination, if there is no obstacle to its employment in the new position or sense." The example given is as follows: *Talinum polyandrum* Hook. (1855) is illegitimate, being a later homonym of *T. polyandrum* Ruiz and Pav. (1798). *Calandrinia polyandra* Benth. (1863), not as a new combination, but as a new name, is legitimate. Bentham's name given as an example by the Rules was published in *Flora Australiensis* 1: 172, where a description of the plant was given followed by *"Talinum polyandrum* Hook. Bot. Mag. t. 4833" in synonymy. Clearly, this example is almost identical with that of *Winchia glaucescens,* inasmuch as in both instances the name was accompanied by a description and the specific epithet was borrowed from an illegitimate name with the intention of forming a new combination. Therefore, *Winchia glaucescens* was a legitimate new name and as such is the earliest binomial having a specific epithet which must be used for the present plant.

There is one difference between the case of *Winchia glaucescens* and that of *Calandrinia polyandra.* There is good reason to believe that Schumann was not aware that Don's *Alyxia glaucescens* was illegitimate; he was motivated not by choice but entirely by his understanding of the requirements of priority. Likewise, Bentham most probably was not aware that *Talinum polyandrum* Hook. was a later homonym, but the evidence for believing this is not as direct as in Schumann's case. It is conceivable that had Schumann understood the poor position of Don's name he would not have adopted Don's inadequate specific epithet. In such a case, by attributing *Winchia glaucescens* to him we would be forcing him, perhaps against his "wish," to be responsible for a name he would have abjured had he known that choice was left to him. Adding the phrase, "if he wishes," to the author's prerogative, does not help to clarify the meaning of Art. 69.

Type of *A. rostrata.*—"Thaton, Yatheytaung, 2500 ft., flowers Mar., *P. Chin* per *C. E. Parkinson 6536* (type), vernacular name *Taung-mayo;* Mergui, Victoria Point, 75 ft., flowers Jan., *Sukoe* per *C. E. Parkinson 6295;* fr. Mar., *Sukoe* per *C. E. Parkinson 7684* (type for fruit.) (Burma)." The collector's number appearing on the type collection is *6563.*

Type of *A. pachycarpa.*—"Hainan: Ting-on, Mocheung Ling, *N. K. Chun* and *C. L. Tso 44317.* Nov. 22, 1932; a large tree up to 25 m. high, the trunk 80 cm. in diam., in forests, alt. 600 m."

§ PALA

Leaves almost always glabrous, the marginal nerve usually clear; corolla tube about 1 cm. or less long; anthers about 0.7–1.6 mm. long, usually not dehiscing to extreme base; style long and slender; ovary usually superior; follicles long; seeds about 8 mm. or less long, 1–2 mm. broad.

Common throughout the range of the genus except in the far eastern Pacific.

2. **Alstonia scholaris** (L.) R. Br., in Mem. Wern. Soc. 1: 76. 1811.

"Pala" Rheede, Hort. Malab. 1: 81, t. 45. 1678.

"Nerium lactescens malabaricus platyphyllus ..." Breyn., Prod. 2: 86. 1739.

"Lignum scholare" Rumph., Amb. 2: 246 [t. 82?]. 1741.

Tabernaemontana citrifolia L., Sp. Pl. 1: 210. 1753; as to cit. "Pala Rheede." Hill ed., Hort. Mal. 1: t. 46 [non diagnosis]. 1774.

Echites scholaris L., Mant. 53 [non cit. t. ?]. 1767.

Tabernaemontana alternifolia Burm., Fl. Ind. 69. 1768; as to cit. pro part.

Aeschynomene laevis Noronha, Verh. Batav. Genootsch. 5: 68. 1790; nom. nud. [Syn. fide Miquel.]

Echites ? Pala Ham., in Trans. Linn. Soc. 13: 518. 1822.

A. scholaris β Blumii A. DC., Prod. 8: 409. 1844.

A. scholaris γ *Avae* A. DC., Prod. 8: 409. 1844.

? *A. Kurzii* Hook. f., Fl. Brit. Ind. 3: 643. 1882.

Trees up to 40 m. tall and 1.25 m. in diameter. Petioles about 2 cm. (up to 3 cm.) long. Leaf blades spatulate or oblanceolate, rarely elliptic, 7–28 cm. long and 2–11 cm. broad, usually rounded at apex, rarely bluntly acuminate; shining above; the lateral nerves 40–50 pairs, 3–5 mm. apart, the reticulation and transverse veins prominent on upper surface, the marginal nerve prominent. Inflorescence in dense cymes, many-flowered, pubescent, the pedicels short. Calyx lobes ovate to lanceolate, 1–3 mm. long, pubescent outside and sparsely so inside; corolla tube 6–10 mm. long, densely to sparsely pubescent outside; corolla lobes quadrate-orbicular, 2–4.5 mm. long and about as broad, undulate-margined, pubescent on both sides; anthers 0.9–1.3 mm. long; ovary densely hirtellous; follicles sparsely hirtellous, sometimes glabrous. Seeds lightly muricate-roughened.

TYPE.—Citation by Brown: *"Pala,* Reed mal. 1. p. 81, t. 45. optima. *Lignum scholare,* Rumph. amb. 2. p. 246. t. 82. quoad descriptionem, sed figura potius sequentis. *Echites scholaris,* Linn. mant. 53. Hab. In India Orientali et in Insulis Moluccanis. (v. s. in Herb. Banks)." *Echites scholaris* is based on *"Lignum scholare"* Rumph., Amb. 2: 246, t. 82.

Rumphius' description of *Lignum scholare* is in agreement with *Alstonia scholaris.* "In omnibus aquosae Indiae insulis nota," the plant is identified with *Pala* "In Horto Malabarico tom. 1. Fig. 45," which is unquestionably *A. scholaris.* Linnaeus' *Echites scholaris* rests principally on Rumphius' *Lignum scholare,* although his short description is in fair agreement with *A. scholaris.* A discordant element, however, appears in the figure representing *"Lignum scholare,"* plate 82 of Rumphius' *Herbarium Amboinense* which depicts an *Alstonia* with leaves sharply pointed at the apex (described as "obtuso apice") and with about 12 pairs of principal lateral nerves (described as "plurimis parallelis costis"). This illustration diverges widely from *A. scholaris,* but is not adequate for precise identification. It is noted by Brown to be rather of *A. spectabilis*; the leaves are 4- to 6-verticillate, otherwise there is strong justification for Brown's observation. The inflorescence as represented is fair for either *A. scholaris* or *A. spectabilis.* Hamilton in 1822, presumably on the basis of this figure, held *"Lignum scholare"* as distinct from *"Pala,"* and named the latter, which he thought unoccupied, *Echites Pala.*

ILLUSTRATIONS. — Philippine Jour. Sci. (1926) 31: t. 1–6, fig. 1–41 (leafy br. and infl., fl., fr., seed, bark, bark anatomy); Koord. and Val., Atl. Baumart. Java (1913) t. 77 (leafy br., infl., fl. analysis, fr., seed, tree habits); Bentl. and Trim., Med. Pl. (1880) 3: t. 173 (leafy br. and infl., fl. analysis, fr., seed); Kirtikar (ed. Basu), Ind. Med. Pl. (1918) t. 606 (leafy br. and infl., fr., fl. analysis, seed); Engl. and Prantl, Nat. Pflanzenf. (1895) 4(2): 138, fig. 53 (leafy br. and infl., fl. analysis, fr., seed); Rheede, Hort. Mal. (1678) 1: t. 45 (leafy br., and infl., leaf, fl., fr., seed); Wight, Ic. Pl. Ind. Or. (1843) 2: t. 422 (leafy br. and infl., fl. analysis—leaf shape and nerves not representative); Ahern, Philippine Woods (1901) 46 (leafy br. and fr., infl.—leaf shape and nerves not representative).

DISTRIBUTION.—The most widely distributed species of *Alstonia*: from India to southern China, south to Malaya and the entire area of Malaysia, east to Queensland and the Solomon Islands. Reported from Liukiu, Yayeama, by Matsumura (Index Pl. Jap. 2: 505. 1912). Grows at 0–1000 m. or more altitude and is tolerant of a variety of soils and habitat.

India—*Anstead 94* (Mangalore; A); *Biswas 1675* (Bengal; A); *Calcutta herb.* (Calcutta; GH); *Dewan 82* (Nakrunda; G); *Erlanson 5310* (Travancore); *Gibson* (Bombay; P); *Hohenacker 295* (Canora; G, P); *Hooker* (Bengal; L); *Jenkins* (Assam; G); *Mukherjee 78* (Nakrunda; US); *Roxburgh* (G); *Wallich 1644, 1644a* (Nepal; G); Wight *2540; Stachey and Winterbottom* (Kumaon; GH).

Ceylon—*Burmann* (G).

Burma—*Bur. For. School Herb. 34* (US), *36* (A), *67* (F); *J. F. Smith 41* (Rangoon; GH).

Siam—*Collins 1935* (Bangkok); *Kerr 3412* (Doi Sutep; BM), *5125* (Chieng Ra; A), *13528* (Bangkok; BM), *13848* (Satul; BM), *15025* (Ban Sai Kao; A); *Marcan 2298* (Bangkok; BM); *Put 3701* (Yala; BM).

Indo-China—*Balansa 4729* (Tonkin; A); *Bon 6190* (Tonkin; A); *Clemens 3869* (Annam); *Petelot 5985* (A); *Poilane 1223* (Annam; A), *6626* (Annam); *Tsang 27098* (Taai Wong; A).

China—*Morse 159* (Kewi Chow; BM, K); *Wong 12* (Kwantung).

Malay Peninsula—*Corner* (Kelatan; Sing); *Curtis 2352* (Selangor; Sing); *Hanad* (Selangor; Sing); *Holltum* (Pahang); *King's Coll. 7952* (Perak; Sing); *Kunstler* (Perak; Sing); *Watson 5835* (Johore; Sing).

Sumatra—*Boschproefst. 6610* (Pajacombo; leaves dried an unusual yellowish-green, sterile; L), *8004* (Lampongs; L); *Vries and Teysmann* (L); *Zollingero 3393* (L).

Java—*Backer* (Batavia; L); *Elbert 354* (Madioen; L); *Junghuhn* (L); *Koorders 9* (Bantam; L), *10* (Preanger; L), *11* (Madioen; L), *14* (Semarang; L), *16* (Soerakarta; L), *18* (Banjoemas; L), *19* (Tegal; L), *21* (Pekalongan; L), *23* (Madioen; A), *25* (Besoeki; L), *27* (Djember; L), *25535* (Semarong; L), *28201* (Telawan; L), *37222* (Djapara; L); Merrill (cult. IV–A–40; IV–A–46; IV–A–61); *Neth. Ind. F. S.* (Bondowoso; A); *Sargent* (cult. IV–A–84; A); *Teysmann; Wisse 753* (Madioen; L); *Zollinger 3567* (G, K), *3567* (BM).

Bali—*Becking 29* (L).

Timor—*Herb. Lug. Bat.* (L); *Herb. Mus. Paris* (G, L).

Borneo—*Clemens 30883, 30884* (Mt. Kinabalu; sterile; G, A); *D. D. Wood 1914* (Brit. N. Borneo; UC).

Philippines—Luzon: *Clemens 18819* (UC); *Cuming 1229* (G, L, Mo); *Elmer 8165; For. Bur. 746, 1416, 2682, 17307, 18595* (Bish), *25671* (A), *25867* (F, Mo), *28853* (G); *Merrill Sp. Blancoanae 232; Perrottet* (L). Balabac: *Bur. Sci. 427.*

Celebes—*Boschproefst. 63* (L), *141* (L); *De Vries and Teysmann 46* (L); *Koorders 1607* (L), *15803* (L), *16043* (L), *19735* (L); *Neth. Ind. For. Ser. 21595; Teysmann 12516* (L).

Ternate—*Beguin 665* (L), *1658* (infl. unusually lax; L).

Soelabesi—*Hulstijn 403* (L).

Boeroe—*De Vries* (L).

Amboina—*Neth. Ind. For. Serv. 25997* (Mo); *Kornassi* (L).

Ceram—*Neth. Ind. For. 19650* (L).

Banda—*Herb. Lugd. Batav. 178* (L); *Boschproefst. 13434* (L); *De Vries and Teysmann* (L); *Hallier f. 45* (cult.; L).

Netherlands New Guinea—*Brass and Versteegh 14013; Neth. In. For. Serv. 30499* (Japen; A), *30525* (Japen; A), *30664* (Japen; Mo).

Papua and Northeastern New Guinea—*Carr 11357* (Kanosia); *Brass 686* (Papua; A), *8335* (Gaima; A); *Ledermann 7858* (Sepik; Sing); *Waterhouse 317* (Gazelle Pen.).

Queensland—*Herb. F. D. Mueller* (GH); *Queens. For. Ser. 88, C. T. White* (A).

Bougainville—*D. H. Johnson* (A); *Waterhouse 111.*

Puerto Rico—*Cobin* (cult.).

Dominica—*L. H. Bailey 213* (Bot. Gd.; A).

VERNACULAR NAMES.—See Heyne, Die Nut. Pl. (1927) 2: 1277. The following are some additional local names. India: *Chhatian, Eda-Kula, Saptaparni, Satwin, Shaitan;* Siam: *Ton Tinpet;* Indo-China: *Cay Mua Cua, Cay Phao Luoi, Cay Sua, Cay Vo Cua, Mo Cua Trang, Mu Cua;* Borneo: *Poelanten Boeboor;* Talaud Islands: *Karakelong, Pampoeloeta, Pamperoeda;* Philippines: *Dita, Dalipaoen;* New Guinea: *Aijapa, Amika, Devoru, Didima, Itig;* Bougainville Island: *Kingiri, Sinivi, Tangovo, Uajii;* Queensland: *Milkwood* or *White Pine.*

Breynius' *"Nerium lactescens . . ."* is based on *"Pala" Horti Malabarici.*

Under *Tabernaemontana citrifolia,* Linnaeus cited "Hort. Cliff. 76, Roy. Lugdb. 413; Plum. gen. 18; *Pala* Rheed. mal. 1. p. 81. t. 46." The citation of "t. 46" for *Pala* is an error for "t. 45." Only because of its reference to *Pala* is the name listed under *A. scholaris. T. citrifolia* in Hill's 1774 edition of *Horti Malabarici* is given to figure 46, which is a copy, in part, of figure 45 in the 1678 edition; the description here is also copied from Rheede, but the diagnosis refers to the Linnaean species.

Under *Tabernaemontana alternifolia,* citation was made of "Breyn. prodr. 2, p. 86; *Lignum scholare* Rumph. amb. 2 p. 246, t. 82" and "*Curutu-pala* Rheede mal. 1, p. 83, t. 46." The name is listed under *A. scholaris* principally because of its reference to *Lignum scholare* and partly because of its reference to Breynius' work (see *Nerium lactescens,* etc.).

The only information Noronha gives for *Aeschynomene laevis* is that it is a new species bearing the Javanese name "Caju Gabus." It here apears in the synonymy of *Alstonia scholaris* entirely on the authority of Miquel. The Malayan name "Kajoe Gaboes" is sometimes applied to *A. scholaris* (*fide* K. Heyne).

Type of *A. scholaris β Blumii.*—"In Java (Blum. bijdr. p. 1037)." Blume described this as "*A. scholaris* variet.," without varietal name, and stated: "ad pedem montis Salak . . . foliis cuneato-oblongis obtusis, umbellis effusis." The indications are that this variety was based on a trivial variation in leaf shape. It is unlikely that it was confused with *A. spatulata,* for Blume knew this species, he himself having published it. There is no evidence that it is *A. pneumatophora,* which also has cuneate leaves. The latter is either rare or lacking in Java; its leaves are almost identical with those of *A. spatulata,* and it is presumed that Blume would have noted the foliage similarity if the variety before him had been *A. pneumatophora.*

Type of *A. scholaris γ Avae.*—"In montibus Tong-Dong prove Avam. *A. scholaris* Wall. list *1644. f.*" Ava is in Burma, and according to Wall. Num. List, 6th citation under *1644,* the Toong plant was collected by William Griffith. This variety apparently was based on a trivial variation in leaf shape; "foliis elongatis. Folia 6–8 poll. longa, 1½–2¼ poll. lata, apice angustata obtusiuscula."

Type of *A. Kurzii.*—"Forests of the Andaman Isls., *Kurz.*" Hooker placed this under "Species of Doubtful Position," and stated that it was the "*A. spectabilis* Kurz For. Fl. 2: 183, not of Brown." Hooker's description obviously is derived from Kurz. The only character adduced to distinguish this species from *A. scholaris* is the "quite glabrous" inflorescences or the "glabrous panicle." Kurz (1877: 254) noted that it is "hardly specifically distinguishable from *A. scholaris.*" The density of pubescence in the inflorescences of *A. scholaris* varies greatly, but I have never seen any specimen completely glabrous.

Alstonia oleandraefolia Lodd. ex. Loud., Hort. Brit. (1830) 67, is referred to *A. scholaris* by G. Don (1837: 86) and in the Index Kewensis. In Hort. Brit., *A. oleandraefolia* is listed without description and *Nerium tinctorium* Hort. is cited in synonymy. *Nerium tinctorium* Hort. ex Sweet, Hort. Brit. ed. 1. (1826), 274, was published merely as a synonym of *Allamanda verticillata* Desf. ex Spreng. The description of the latter in Sprengel's Syst. is inadequate for precise identification. Desfontaines (1815) listed *Allamanda verticillata* under the heading "Germen simplex, fructus baccatus aut rarius capsularis." From this characterization it is clear that *Allamanda verticillata* is not an *Alstonia,* and consequently neither is *Alstonia oleandraefolia.*

Nerium tinctorium Hort. ex Sweet has been placed in synonymy, under *A. scholaris,* by G. Don (1837: 86) and others. As shown above, there is no justification for associating the two names. C. B. Robinson (1908: 306) states that *Nerium tinctorium* in Perrottet (1824: 132) is from description probably *Alstonia scholaris.* Following this lead, Merrill (1923:

323) made *"N. tinctorium* Perr." a straight synonym of *A. scholaris.* Perrottet's casual description (tree 6–10 m. tall, with opposite leaves which are soft to the touch) hardly suggests *A. scholaris;* the characters given agree better with those of *Wrightia.* The illustrations cited by Perrottet ("Hort. Malab. 1: t. 46 and 2: t. 54 and 55") are not of *Alstonia,* unless by the first citation reference was made to plate 46 of Hill's edition of *Hortici Malabarici.* The brilliantly colored blue dye furnished by the leaves of the plant Perrottet had in mind excludes *Alstonia,* but rather points to *Wrightia.* Roxburgh was thoroughly acquainted with the indigo qualities of *Wrightia tinctoria* and is reported to have transmitted a sample of the dye to England in 1792. A specimen deposited at the New York Botanical Garden (*Perrottet 325,* from Pondicherry) is *Wrightia tinctoria.* The combination *Nerium tinctorium* was first published by Roxburgh in 1803 (Berlin Ges. Nat. Freunde N. Sch. (1803) 4: 198).

Echites malabaricus Lam., which is referred to *A. scholaris* in the Kew Index and dubiously to *Echites Pala* by Sprengel, is not an *Alstonia.*

Hamilton (1822: 517) erroneously credits the name *"Tabernaemontana scholaris"* to Linnaeus and Burmann.

2a. **Alstonia scholaris** var. **velutina** Monachino, var. nov.

A forma typica speciei foliis pubesentibus recedit.

Leaves velutinous beneath. Corollas in type less pubescent outside than in typical *A. scholaris.*

TYPE.—*R. E. Holttum* (Singapore Field no. *24680*), Malay Peninsula, state of Pahang, Tekal; April 22, 1931. (Singapore.)

Foliage indumentum in the § *Pala* is very unusual. Of the numerous specimens of *A. scholaris* examined (over 300), this variety is the only pubescent one; the others, and also the collections seen in other species in the section, have completely glabrous leaves.

3. **Alstonia Boonei** De Wild., in Fedde Repert. 13: 382. 1914.

Very closely resembling *A. scholaris* in vegetative and floral characters, but flowers on longer pedicels and more loosely disposed, and follicles tomentose.

TYPE.—"Belgisch-Kongo: Environs de Nala, 1911 (Boone)."

ILLUSTRATIONS.—Chevalier, La Geog. Bot. et Fl. Econ. du Senegal et du Soudan (1900) 207 (as *A. scholaris;* photo of leafy br. and infl.); Eggeling, The Indig. Trees of the Uganda Protector. (1904) t. 2 (as *A. congensis;* photo of tree showing habit and habitat).

DISTRIBUTION.—West tropical Africa, Angola to Gambia, and easterly to Uganda and Sudan; sometimes abundant.

Congo—*Boone* (type; Br); *Bequaert 1790* (Avokubi; Br); *Briey 17* (Br); *Cabra 63* and *72* (Br); *Claessens 113* and *379* (Br); *Coulon 3* (Bodala; Br); *Dawe 243* (Angola; K); *Dewulf 342* (Bas Uele; Br); *Gillardin 149* (Bakuba; Br); *Gossweiler 6611* (Angola; BM), *6788* and *8012* (Cabinda; K); *Laurent* (Lusambo; Br.); *Lemaire 6* (Bangola; Br); *Louis 1184* (Belg.; Br), *3057, 3127, 6206, 9507, 13538, 13825* (Yangambi; Br), *13849* (Weko; Br); *Mortehan 973* (Dundusana; Br); *Pynaert 334* (Br); *Reygaert 976* (Mobwasa; Br); *Robyn 1348* (Bamabia; Br, G, K); *Vermoesen* (Br), *1443* (Mayombe; Br).

Uganda—*Cons. For. 4422* (A); *Eggeling 1546* (US), *1547* (BM), *1548; Harris 403–405* (K).

Sudan—*Chevalier 2690* (G, L); *Schweinfurth 3260* (Niamniam; K); *Thomas 1761* (K); *Turner 157* (Azza; K).

Cameroons—*Lehman* (Lolodorf; K); *Mildbraed 10708* (N.E. Victoria; A); *Zenker 433* (Bipindi; G, GH, Mo, NY, UC, US), *1622* (Bipindi; K, L).

Nigeria—*Foster* (Lagos; K); *Kennedy 1956, 2393* (A), *2084* (BM, K); *McLeod* (K); *Punch 137, 145* (Lagos; K).

Gold Coast—*Brown 2355* (Kumasi; A); *Deighton 3416* (Aburi; K); *Irvine 1851* (Ku-

masi; K); *Kitson 1019* (Ankobra; K).

Ivory Coast—*Chevalier 15194* (Bingeroville; G).

Sierre Leone—*Deighton 2993* (K); *Thomas 3934* (K).

Gambia—*Dawe 37* (K).

VERNACULAR NAMES.—Belgian Congo: *Guga, Okuka;* Mayombe: *Songoti;* Bunyoro: *Mujwa.*

This species is in many respects more closely related to *A. scholaris* than it is to *A. congensis.* It might be conceived as an African variety of the former. The three form a closely knit unit.

The greater part of the material distributed as *A. congensis* belongs to this species.

4. **Alstonia congensis** Engl., Bot. Jahrb. 8: 64. 1886.

A. Gilletii De Wild., Miss. É. Laurent. 1: 537. 1907.

A. Gilletii var. *Laurentii* De Wild., Miss. É. Laurent. 1: 537. t. 162. 1907.

A. congensis var. *glabrata* Hutch. & Dalz., Fl. W. Trop. Africa 2: 42. 1931.

Leaf blades closely resembling those of *A. Boonei,* more often acuminate at apex, sessiloid or sessile. Inflorescence sparsely puberulent or glabrous, generally more loosely and sparsely flowered than that of *A. Boonei;* calyx glabrous or sparsely pubescent; corolla tube 3.7–5.7 mm. long, pubescent outside; corolla lobes 4.8–7.3 mm. long and 2.5–4.7 mm. broad; anthers 1.2–1.6 mm. long; ovary glabrous or sparsely hairy. Follicles glabrous.

TYPE.—"Congo; infra Ponta da Lenha. (4.9.74.)." Dr. Naumann, from Boma district.

ILLUSTRATIONS.—Vermoesen, Man. Essences Forest. Congo Belge (1923) 16 (leafy br. and infl., fr., seeds); De Wildeman, Miss. É. Laurent. (1907) 2: t. 162 (as *A. Gilletii* var. *Laurentii;* leafy br.).

DISTRIBUTION.—West tropical Africa, the Congo Luanda, and Belgian Congo to Nigeria. Sometimes abundant; prefers humid habitat.

Congo—*Claessens* (Br); *Corbisier-Baland 1594* (Br, K); *Dawe 305* (Angola; K); *Demeuse 113* (Br); *Germain 78* (Yandjia; Br); *Ghesquiere 771* (Kasi; Br); *Gilbert 54 m* (Wolenge; Br); *Gillardin 307* (Bakuba; Br, K); *Gillet 3532* (Belg.; Br), *3751* (cotype *A. Gilletii;* Br); *Laurent* (3/1/04; type *A. Gilletii* var. *Laurentii;* Br); *Lebrun 6691* (Mushie; Br); *Leemans 576–580* (Eala; Br); *Leontovitch 28* (Budjala; Br); *Louis 12128* and *12134* (Yangole; Br); *Mortehan 848* (Dundusana; Br); *Naumann* (4/9/74; type coll. *A. congensis;* K); *Paynaert 788* (cotype *A. Gilletii;* Br); *Sapin* (Kasai; Madibi; Br); *Vanderyst* (Balanda; Br).

South Nigeria—*Dalziel 1256* (type *A. congensis* var. *glabrata;* K).

VERNACULAR NAMES.—Same as for *A. Boonei.*

Cotypes of *A. Gilletii.*—"Region de Kisantu, 1904 (*J. Gillet 3531*); Sanda, 1904 (leg. Oddon, coll. J. Gillet 3751); Eala, decembre 1906 (*L. Pynaert 788*)." The type of *A. Gilletii* var. *Laurentii,* collected by Laurent, "Bolombo, 3 janvier 1904," is of sterile material. It was distinguished from the typical plant by the fact that the leaves were more numerous in each verticil (9, as against 4–7 in the typical species). This character is too trivial for varietal segregation.

Type of *A. congensis* var. *glabrata* (Kew Bul. 1937: 337).—"S. Nigeria: Lagos Town, Oct., *Dalziel 1256.*" *A. Boonei* ("*A. congensis*" of most authors and herbarium distribution) served as the basis for comparison with this plant. Hutchinson and Dalziel did not judge their plant as sufficiently different from *A. Boonei* for specific rank.

The type is sterile and was collected from a young plant ("Strauch"). When flowering specimens of African *Alstonia* were subsequently collected they were referred to this species because of the great vegetative similarity and because *A. congensis* was the only African species known at that time. This flowering material was accepted as characterizing *A. congensis.* Then *A. Gilletii* was distinguished, chiefly on basis of its strikingly different floral features. As numerous collections accumulated it became evident that two

species were involved in African *Alstonia.* These, although best distinguished by their flowers, almost always present slight differences in leaf habit, differences which are quite evident in typical collections. From a study of the vegetative features of *A. Gilletii* and the type of *A. congensis* it is concluded that the two represent one and the same species. Consequently the plants previously referred to *A. congensis* need some other name. This need is filled by *A. Boonei.*

5. **Alstonia angustiloba** Miq., Fl. Ind. Bat. 2: 438. 1856.

A. calophylla Miq., Fl. Ind. Bat. 2: 439. 1856.

A. angustiloba var. *β glabra* Koord. & Val., Bijdrage 1: 121. 1894.

A. iwahigensis Elmer, Leaflets Philip. Bot. 4: 1447. 1912.

Paladelpha angustiloba Pichon, in Paris Mus. d'Hist. Nat. Bul. II, 19: 299. 1947.

Trees up to 40 m. tall and 1 m. in diameter. Petioles 2–3.5 cm. long. Leaf blades elliptic, 7–23 cm. long and 3–8 cm. broad, acuminate at apex, the lateral nerves 45–100 pairs, 1–3 mm. apart, horizontal, very straight, the transverse veins often prominulous on upper side but not as prominent as those of *A. scholaris.* Inflorescence puberulent, many-flowered, the pedicels short (up to 3 mm. long), puberulent; calyx lobes ovate to lanceolate, 0.9–2.2 mm. long, obtuse or acute at apex, puberulent outside, glabrous or sparsely hairy inside, ciliate; corolla tube about 6–7 mm. long, glabrous outside; corolla lobes oblong-ligulate to almost orbicular, very faintly ciliate near apex; anthers 0.7–1 mm. long; follicles varying from densely puberulent to glabrous.

TYPE.—"*Alstonia spectabilis* herb. L. Batav. excl. syn. R. Br. Java."

ILLUSTRATIONS.—Koord. and Val., Atl. Baumart. Java (1916) t. 642 (leafy br. and infl., fl., fl. analysis, frs., seed, habit of tree).

DISTRIBUTION.—Malay States, Sumatra, and Java, north to Borneo and Palawan in the Philippines. Reported from rain forests and teak woods; also from limestone hills.

Malay States: *Alvin's coll.* (Malacca; Sing); *Cantley 166* (Singapore; K); *Corner* (Johore; Sing); *Curtis 3087* (Penang; Sing); *Derry 138* (Malacca; Sing); *Fox's coll. 12699* (Penang; Sing); *Griffith* (Malacca; G, K, L); *Hervey* (Malacca; K); *Holttum* (Singapore; Sing); *King's coll. 5270* (Perak; K); *Ridley 8090* (Singapore; Sing), *8095* (Singapore; K); *Wray 4058* (Perak; K, Sing).

Riouw: *Neth. Ind. For. Serv. 27574* (Mo).

Sumatra: *Achmad 665* and *1032* (Simaloer; L), *1086* (Simaloer; K, L, Sing); *Bartlett 7251* and *8432* (Asahan); *Boschproefst. 515* and *598* and *831* and *919* and *4148* (Palembang; L); *Endert E. 1065* (Benkoelen; L); *Krukoff 204* (Kisarin; NY, US); *Neth. Ind. For. Serv. 31968* (Palembang; A); *Teysmann* (herb. L. Bat. *994*; Loeboe Aloeng; type coll. *A. calophylla*; G, K, L); *Thorenaar 831* (Palembang; L).

Java: *Herb. Hort. Bat. Bog. 285* (cult. IV–A–47; US); *Kollmann* (1838); *Koorders 1* (K), *12341* (Soekaboemi; UC), *14230* (K); *Neth. Ind. For. Serv. 3923* (Pandeglang; A).

Borneo: *Haviland 1732* (Kuching; K, Sing); *Neth. For. Serv. 14202* and *16068* (A), *18857* (Berouw; A); *Motley 775* (Bangormassing; K). Brit. North Borneo: *Keith 1271* and *1321* (Sandakan; K).

Philippines: Palawan: *Elmer 13167* (type coll. *A. iwahigensis*; A, F, G, GH, K, L, Mo, NY, US); *Merrill 748* (sterile; NY, US).

VERNACULAR NAMES.—British North Borneo: *Pulai;* Malay States: *Jelutong.*

Type of *A. calophylla.*—"Sumatra, bij Loeboe Aloeng (Teysm.)." Sterile, and apparently consists merely of juvenile leaves. Closely resembling the type of *A. calophylla* are *Krukoff 204* and, less so, the *Hervey* (June 29, 1885) collection. Flowering material has not yet been directly linked with these leaf forms.

A. angustiloba var. *glabra* was distinguished solely by its glabrous ovary, that of the typical form being hirtellous. The ovaries of the specimens examined vary from completely glabrous to very sparsely pubescent (several hairs present) to sometimes definitely hirtellous. Because

of this intergradation and the lack of any other distinguishing feature the variety is not recognized.

Type of *A. iwahigensis.*—"*13167,* A. D. E. Elmer, Puerto Princesa (Mt. Pulgar), Palawan, May, 1911, Philippines. Of the species only one tree was found in fertile soil of humid forests at 750 feet alt. along the trail to Napsan on the opposite coast of the island." The inflorescence is somewhat more congested, and the calyx lobes are slightly longer and sharper at the apex than is usual for *A. angustiloba.*

The Palembang material which has been distributed under an unpublished name attributed to Backer in manuscript belongs with *A. angustiloba.*

6. **Alstonia pneumatophora** Backer ex L. G. Den Berger, in Meded. Proefst. Thee 97: 153. 1926. Ex K. Heyne, Nutt. Pl. Ned.-Ind. ed. 2, 2: 1277. 1927.

Foliis his *A. spatulatae* consimilibus et floribus his *A. angustilobae* consimilibus; folliculis furfuraceo-rubiginoso-puberulis pilis minutis crispis.

Trees up to 45 m. tall and 1 m. in diameter. Petioles 0–7 mm. long; leaf blades spatulate, rounded or slightly retuse or faintly blunt-acuminate at apex, 4–11 cm. long and 2–4.5 cm. broad, the lateral nerves 20–35 pairs, 2–4 mm. apart, often a little ascending, lightly arcuate, the transverse veins and reticulation usually obscure. Inflorescence with many crowded flowers, puberulent, the pedicels very short; flowers closely resembling those of *A. angustiloba*; calyx lobes 1.4–1.9 mm. long, puberulent outside and inside; follicles scurfy rusty-puberulent with minute crisped hairs.

LECTOTYPE.—*Boschproefst. 28 E. 1 P. 505,* Sumatra, Palembang; fl. and fr. (Leiden.)

ILLUSTRATIONS. — Meded. Proefst. Thee (1926) 97: t. 29, fig. 113 (wood anatomy).

DISTRIBUTION.—Sumatra, Borneo, and Celebes; moist habitat.

Sumatra: *Boschproefst. 418* (Palembang; K, L, Sing), *502* (Palembang; L), *505* (type coll.; Palembang; K, L, P), *511* and *512* (Palembang; L), *536* (Palembang; L, UC), *Grashoff 785* (Palembang; L), *Neth. Ind. For. Serv. 19853* (Ophir; A), *19860* (Ophir; L), *23838* (Palembang), *31007* (Tapanoeli; A), *Yates 842* (Asahan; A).

Riouw: *Boschproefst. 6304* (Karimon; L), *9965* (L).

Borneo: *Abubakar 4236* (Beaufort; Sing), *Bartlett* (Sarawak; BM), *Haviland 1689* (Sarawak; K, Sing), *Neth. For. Serv. 16089* (L), *17783* (A).

Celebes: *Boschproefst. Cel/111/51* (L), *Cel/111/130* (A).

VERNACULAR NAMES.—Heyne reports the following: *Basoeng, Poelai Kapoer, Poelai Renah. Pulai Lilin* (Brunei) appears on an herbarium label.

This species has not hitherto been described taxonomically, therefore a Latin diagnosis has been included. Berger treated the wood anatomy, whereas Heyne presented some general features such as habit, habitat, pneumatophores, wood, and uses.

6a. **Alstonia pneumatophora** var. **petiolata** Monachino, var. nov.

A forma typica speciei petiolis elongatis usque ad 2.5 cm. longis recedit.

Differs from the typical form in its very long petioles, which are about 2 cm. long; the leaf blades are somewhat less spatulate, the lateral nerves about 23 pairs, 3–4 mm. apart.

TYPE.—*Endert 28 E. 1 P. 537,* Archipel. Ind. Sumatra, Palembang. (Leiden.)

7. **Alstonia spatulata** Blume, Bijdr. 1037. 1826.

A. cuneata Wall., Num. List 1645. 1829 (nom. nud.).

A. cuneata Wall. ex G. Don, Gen. Syst. 4: 87. 1837.

A. cochinchinensis Pierre ex Pitard, in Lecomte and Humbert, Fl. Gen. Indo-Chine 3: 1165. 1933 (pro synon.).

Trees seldom greater than 15 m. tall (reported 30 m. or more) and 50 cm. in diameter.

Petioles 0.5–1.5 cm. long; leaf blades closely resembling those of *A. pneumatophora.* Inflorescence very loosely cymose, very sparsely flowered, the pedicels 10 (–13) mm. long; calyx lobes ovate-deltoid, 1–2 mm. long, obtuse at apex, ciliate, otherwise completely glabrous; corolla tube glabrous outside; corolla lobes 6.9–11.4 mm. long and 4–5 mm. broad, barbate at base within and very faintly ciliate near apex, otherwise glabrous; anthers 1–1.3 mm. long; ovary glabrous; follicles 3–5 mm. in diameter, glabrous.

TYPE.—"circa Rompien." Java, Blume.

ILLUSTRATIONS.—Koord. and Val., Atl. Baumart. Java. (1916) t. 643, 644 (leafy br. and infl., fls., fl. analyses, fr., seed, habit of trees); Die Umschau (1934) 38: 170, fig. 1 (photo showing a group of trees growing in water), 171, fig. 2 (photo of piece of root).

DISTRIBUTION.—French Indo-China and Siam to Sumatra, Java and Borneo. Said not to be found in eastern and middle Java. Grows in marshlands or low rich soil, often in swamps in water up to 1 m. deep.

French Indo-China: *Pierre 4409* (Baria and Thu-dau-mot; A, NY); *Thorel 1146* (Thu-dau-mot; A, US).

Siam: *Kerr 15078* (Pattani; BM, K, Mo), *15612* (Pak Zing; A, BM, K); *Rabil 255* (Trang; A, BM, K).

Malay States: *Burkill 1296* (Selangor; UC); *Cantley 1937* (Malacca; K); *Derry 1064* (Malacca; Sing); *Griffith* (Malacca; K); *King's coll. 4009* (Perak; BM, K), *7464* (Perak; L), *7780* (Perak; BM, Sing); *Maingay 1068* (K, L), *1712, 1716* (Malacca; K); *Sing. For. F.M.S. 1296, 1821* (Selangor; Sing), *15245, 20191* (Selangor; K), *2159* (Perak; K, Sing); *Scortechini 1716* (Perak; G, K); *Wray 170 bis* (Perak; BM).

Sumatra: *Boschproefst. 823* (L); *Mus. Econ. Bot.* (Palembang; L); *Endert E. 823* (Palembang; L); *Rappard 122 DB* (Benkoelen); *Rahmat si Boeea 8243* (Asahan; A); *Rahmat si Toroes 1866* (vicinity of Rantau Parapat), *5219* (Tapanoeli); *Yates 2166* (Asahan).

Bangka: *Boschproefst. 15404* (L).

Java: *Backer 31166* (Batavia; K); *Kollmann; Koorders 40502 β* (Bantam; A); *Zollingero 3567* (P).

Borneo: *Amdjah 2* (K, L); *Edwards 3890* (Brit. N. Borneo; K); *Hallier 99; Haviland 1689* (Sarawak; BM), *3044* (Sarawak; Sing); *Lobbe* (K); *Neth. Ind. For. Serv. 18115* (Koeala; A); *Polak 461* (Ameontai; Mo); *Wood 2601* (Brit. N. Borneo; UC).

VERNACULAR NAMES.—Siam: *Tia*; Sumatra: *Kajoe-Poele, Kajoe Gaboeh, Poelai*; Sunda Area: *Gabusan, Lane Bodas*; British North Borneo: *Pulai Paya, Tambailik.*

Type of *A. cuneata.*—"Native of Sirmore, where it was collected by Dr. Gowan. *Wall. cat. no. 1645.*" Sirmur, in Punjab, is the wrong locality, as pointed out by Hooker and King and Gamble. The name is placed in synonymy of *A. spatulata* by these authors and others. The sparsely flowered inflorescence ("peduncle 3-flowered?") and the shape of the whorled leaves ("obovate, retuse at top") described for *A. cuneata* point to *A. spatulata.*

8. **Alstonia actinophylla** (A. Cunn.) K. Schum., in Engl. and Prantl, Natürl. Pflanzenfam. 4 (2): 138. 1895.

Alyxia actinophylla A. Cunn., in Bot. Mag. 61 (new ser. 8): 3313. 1834.

Alstonia verticillosa F. v. Muell., Fragm. 6: 116. 1868.

Trees up to 20 m. or more tall; branches slender. Petioles about 1 cm. long. Leaf blade elliptic or sublanceolate, 5–12 cm. long, 1–3 cm. broad, narrowed or sometimes short-acuminate at apex, the margins unrolled, the lateral nerves 35–50 pairs, about 2 mm. apart, the transverse veins more or less prominulous. Inflorescence loosely cymose, many-flowered, glabrous, the pedicels slender, distinct, up to 4 mm. long, glabrous; calyx lobes broadly ovate, about 1–1.5 mm. long, rounded or obtuse at apex, ciliate, puberulent with adpressed hairs inside, otherwise glabrous; corolla tube about 8 mm. long, glabrous outside; corolla lobes 4–5 mm. long, barbate at base within and very sparsely ciliate toward apex, otherwise glabrous; anthers

dehiscing almost to base; follicles glabrous; seed faintly muricate-roughened.

COTYPES CITED.—"Hab. in Australasia, ad oras tropicas; nempe Endeavour River, supra littus orientale, necnon littora septentrionali-occidentalia, Montagu Sound, etc. 1820 *A. Cunningham.* (v.v.)."

LECTOTYPE.—*Cunningham 206,* Australia, Montague Sound (Gray Herbarium).

ILLUSTRATIONS.—Schimper, Pflanzen-Geogr. (1898) 353 (as "*A. verticillata*"; br. and petioles only).

DISTRIBUTION.—Northern Australia and southern New Guinea. Often common in tropical scrub, rain forests, and savannas.

Australia: Queensland: *Bailey 148* (Hammond Island; Bri); *Cowley 13* (Cooktown; Bri); *Cunningham 378* (cotype coll. *Alyxia actinophylla;* Endeavour Rv.; K); *Daemel* (Cape York Penins.; K); *Hill 67* (Albany Is.; K); *Norton* (Cooktown; Bri); *Persich 31* (Endeavour Rv.; Bri); *Thurston 3996* (Bri); *Whitehouse* (Cape York Penins.; Bri). Northern Territory: *Armstrong 372* (Port Essington; K); *Mueller* (Roper Rv.; K); *Schultz* (Port Darwin; K). Western Australia: *Cunningham 206* (cotype coll. *Alyxia actinophylla*; Montague Sound; GH, K).

New Guinea: Papua: *Brass 8282* (Gaima; A), *7940* (Lake Daviumbu; A). Netherlands New Guinea: *Koch* (Merauke; L), *Versteeg 279* (Merauke; L).

Type of *A. verticillosa.*—"Ad promontorium Cape York; Daemel."

§ BLABEROPUS

Shrubs about 8 m. or less tall, sometimes dwarf. Glands at axils of leaves numerous, deltoid to linear, up to 3 mm. long; pedicels distinct, long, 5–15 mm. long. Calyx about 2 mm. diam., glabrous or sparsely pubescent outside like the inflorescence, the lobes ovate to ovate-lanceolate, acute or sometimes obtuse at apex, about 1–2 mm. long (lanceolate-acuminate and up to 3.5 mm. long in *A. yunnanensis*), margins thin; corolla glabrous outside (some scattered hairs present in *A. yunnanensis*); anthers dehiscing their entire lengths; ovary superior, glabrous, the disc with lobes 0.7–2 mm. long, varying in length; style long and slender; stigma-apiculi about 0.5 mm. or less long; follicles short, about 15 cm. or less long, glabrous; seeds about 7–11 mm. long and 2–4 mm. broad, thin, the surface minutely foveolate and smooth (seeds rather thick and muricate in *A. yunnanensis*), the cilia about 0.5–1 cm. long.

The species in this section are known from India to China and Java. In general they prefer high altitudes, and are rare and localized. Specimens are poorly represented in herbaria, and are generally very difficult to distinguish; fruits as well as flowers are important for precise identification.

9. **Alstonia venenata** R. Br., in Mem. Wern. Soc. 1: 77. 1811.

Echites venenata Roxb., Hort. Beng. 20. 1814.—nom. nud.

Blaberopus venenatus A. DC., Prod. 8: 411. 1844.

Shrubs 2–3 (–7) m. tall. Petioles 1–2.5 cm. long, leaf blades more or less elliptic, usually broadest slightly above the middle, 6–22 cm. long and 2–5.5 cm. broad, the lateral nerves 70–100 pairs, 1–3 mm. apart. Calyx lobes ciliate, otherwise glabrous; corolla tube 2–3 cm. long; corolla lobes 1–2 cm. long; anthers 1.8–2.5 mm. long; lobes of disc linear-lanceolate, 1.5–2 mm. long; stigma-apiculi very short and blunt; follicles 6–13 cm. long and 6–7 mm. diam., the slender stipes 1.5–3 cm. long.

TYPE.—"India Orientali, Gul. Roxburgh, M. D. (v.s. in Herb. Banks)."

ILLUSTRATIONS.—Lodd Bot. Cab. (1826) 12: t. 1180 (veg., fls.); Wight, Illustr. Ind. Bot. (1850) 2: t. 154–6, E (as *A. scholaris*; fl. analysis, seed, embryo; obviously § *Blaberopus,* prob. *A. venenata*); Wight, Ic. Pl. Ind. Or. (1843) 2: t. 436 (veg., fls., frs.; follicles better represent those of *A. neriifolia,* as they are not stipitate).

DISTRIBUTION.—Native to India; probably

also in Burma.

India: *Anglade* (Pulney Hills; fl.; A), *25* (Pulney Hills; fl. and fr.; G); *Anstead 13* (Travancore; fl.; A); *Bourne* (Madras; fl. and fr.; K) (Kodaikanal Ghat; fl.; K); *Gamble 11421, 14320* (Nilgiri; fl.; K); *Hohenacker 1385* (Nilgiri; fl. and fr.; G); *Roxburgh* (fl.; BM); *Stocks et al.* (Konkan; fl. and fr.; Bri, K, NY); *Talbot 793* (Kanara; fl. and fr.; K); *Thomson* (Madras; fl., fr.; G, GH, K); *Wallich 1647* (fl. and fr.; K), *1647 β* (Hort. Bot. Cal.; fl. and fr.; G); *Wight 1871* (Nilgiri; fl.; K), *1871 bis* (Courtallum; fl. and fr.; G, K, NY, Sing, UC).

Burma: *Parkinson 6152* (Northern Shan States, Gokteik Gorge; fl.; fr. necessary to distinguish with certainty from *A. neriifolia* var. *glabra*; K).

Malay Peninsula: Singapore: *Lobb* (loc.?; fl.; K).

Australia: Queensland: *C. T. White 8640* (Brisbane; cult.; fl.; A, Bri).

United States: California: *Walttier* (Santa Barbara; cult.; fl.; A).

West Indies: Barbados: *Waby 127* (Hastings; cult.; fl.; F).

Echites venenata was published by Roxburgh without reference to Brown's species. The plant was noted to be called "Ganda-ganeroo" in the Tailanga language and to have been donated by C. Campbell in 1805.

H. H. Haines (1922:540) states regarding this species "Leaves . . . softly hairy beneath but more or less glabrescent with age."

9a. **Alstonia venenata** var. **pubescens** Monachino, var. nov.

A forma typica speciei foliis inflorescentiisque pubescentibus recedit.

TYPE.—*J. S. Gamble 13973,* India, Madras, Ganjam District, W. Sarada, about 300 m. altitude; 1884; fruiting specimen. (Kew.)

DISTRIBUTION.—Grows together with the typical form.

India: *Gamble 13973* (type), *15905* (Madras, Godavari; fr.; K); *H. H. Haines 3366* (Central Prov., Chanda; fl.; K), *4043* (Orissa, Angul; fr.; K), *4876* (Orissa, Bonai; fr.; K); *Wight 1871* (fr.; mixed with typical *A. venenata* in flower; GH).

10. **Alstonia neriifolia** D. Don, Prod. Fl. Nep. 131. 1825.

Alstonia sericea Blume, Bijdr. 1038. 1826.

Blaberopus neriifolius A. DC., Prod. 8: 411. 1844.

Blaberopus sericeus A. DC., Prod. 8: 411. 1844.

Very closely resembling *A. venenata* var. *pubescens* except for the fruits; glands at leaf axil generally longer than in *A. venenata,* up to 3 mm. long; corolla tube shorter, usually less than 20 mm. long; lobes of disc usually shorter, 0.7–1.5 mm. long, sometimes with faint teeth at either side near base.

TYPE.—"Hab. in Nepalia. *Wallich," Num. List. 1646.*

ILLUSTRATIONS.—Horticulteur Univ. (1845) 6: *37* (as *Blaberopus sericeus*; leafy br. and infl., fl. analysis; plant said to have been brought by Neumann from Madagascar in 1824 and cultivated for a long time at Paris).

DISTRIBUTION.—India, occasionally cultivated but native probably only north in the tropical Himalayan region; the identical species, or one very closely resembling it, is also found in Java.

India: *Calcut. Hort. Bot.* (fl. and fr.; G, K); *Dalzell* (Bombay; cult.; fl. and fr.; K); *Griffith* (fl. and fr.; K); *Helfer 23; Hooker* (Nepal; GH, K); *Pierre 5236* (cult.; P); *Wallich 1646* (fl.; K), *1646 B* (fr.; G, K).

Ceylon: *Thomson* (1845; cult.; fr.; K).

Malay Peninsula: *Dalhonsie* (Penang; fl.; K).

Java: *Blume* (fl.); *Kollmann* (1838; fl.); *Zollingero 1158* (1844; fl.; G).

Réunion: *Bernier* (cult.; fl. and fr.; K).

Mauritius: *Blackburn* (cult.; fl.).

Type of *A. sericea.*—"montosis Salak," Java, Blume.

The Java specimens which have been examined have corolla tubes slightly longer (17–20 mm.) than those from India (12–19 mm.).

The data appearing on the labels of the herbarium material are poor; perhaps some of the Indian collections with longer corollas are from cultivated plants originally derived from Java, thereby confusing the true picture of morphological elements present in the native Indian specimens. If *A. neriifolia* from the Himalayas and *A. sericea* from Java are truly identical, the geographical distribution of the species is anomalous. There are indications that Himalayan elements sometimes extend to western Java in a discontinuous fashion, but such a distribution in *A. neriifolia* would display a habit contrary to that of § *Blaberopus,* which is noteworthy for localization of its species. However, with the specimens now at hand there is no alternative but to consider *A. neriifolia* and *A. sericea* conspecific.

10a. **Alstonia neriifolia** var. **glabra** Monachino, var. nov.

A forma typica speciei foliis inflorescentiisque glabris recedit.

TYPE.—*J. S. Gamble 7574,* Northeast India, Sikkim, Darjeeling; Dec. 1879; fruiting. (Kew.)

DISTRIBUTION.—India: *Gamble 7574* (type). United States: Florida: *For. Pl. Intr. 65248* (Chapman Field, ex Darjeeling; cult.; fl. and fr.; US).

11. **Alstonia Sebusi** (van Heurck & Muell. Arg.) Monachino, comb. nov.

Blaberopus Sebusi van Heurck & Muell. Arg., in van Heurck, Obs. Bot. 2: 188. 1871.

Leaves and fruits as in *A. venenata* var. *pubescens.* Differs in the flowers; corolla tube about 1 cm. long; corolla lobes about as broad as long, very short, about 2 mm. long, the margins rumpled and inrolled; stigma-apiculi sharp.

TYPE.—"India orientali: *Griffith 2343.* (In hb. van Heurck.)."

DISTRIBUTION.—Himalayas; apparently rare. Bhutan: *R. E. Cooper* per *A. K. Bulley* (7/9/14; fr.; BM); *Griffith 2343* (type coll.; fl. and fr.; K).

The type collection of *Blaberopus Sebusi* consists of an infrutescence disjointed from a leafy branch with flowers. These were examined by Bentham, who decided that the species was a mixture, the fruits being of *A. venenata* and the flowers of *A. neriifolia.* The species thenceforth fell into discredit and has not been recognized until now.

There is no justification for believing that the type of *B. Sebusi* is a mixture. A careful examination of the type of indumentum and other individual features in the calyces and pedicels of the fruiting and the flowering material proves almost with certainty that the two parts belong to the same collection. Furthermore, the flowers are not of *A. neriifolia* but of a distinctive element. The discovery in Yunnan of a variety in which the *A. venenata* kind of fruits is associated with the same distinctive flowers found in the type of *B. Sebusi,* is additional proof.

Only a single specimen of flowering material has been examined in the species, and here the flowers are not fully matured. The stigma-apiculi are about 0.5 mm. long and the anthers 1.6 mm. long.

11a. **Alstonia Sebusi** var. **szemaoensis** Monachino, var. nov.

A forma typica speciei foliis inflorescentiisque glabris recedit.

TYPE.—*A. Henry 11932,* China, Yunnan, Szemao, w. mts., about 1500 m. (Kew, presented by Dr. A. Henry in 1898.)

Yunnan: Szemao: *A. Henry 11932* (type; fl.; K), *13244* (fr.; A, K, US).

12. **Alstonia Mairei** Léveillé, Cat. Pl. Yun-Nan 9. 1915.

Wikstroemia Hemsleyana Léveillé, in Bul. Geog. Bot. 25: 41. 1915.

Alstonia paupera Hand.-Mazt., in Anz. Akad. Wiss. Wien. 57: 241. 1920.

Petioles about 1 cm. long; leaf blades resembling those of *A. venenata* but usually smaller, 5–10 cm. long and 1–2 cm. broad, oblanceolate, glabrous, the lateral nerves 30–40

pairs, 1–2 mm. apart. Inflorescence like that of *A. venenata,* somewhat more crowded, glabrous; calyx lobes 1.2–1.8 mm. long, not ciliate; corolla like that of *A. venenata,* the tube about 2 cm. long, the lobes 1 cm. long; anthers 2.2–2.6 mm. long; stigma-apiculi very small; follicles 4–7 cm. long; cilia of seeds white.

TYPE.—"Rochers de Kiang-ti, 2.300 m. juill., 1912 (*E. E. Maire*)." In Cat. Pl. Yun-Nan 279, under "Additions et Corrections," Léveillé places *A. Mairei* in synonymy of *A. venenata,* but the two are amply distinct.

ILLUSTRATIONS.—Sunyatsenia (1934) 2: t. 21 (as *A. paupera;* leafy br. and infl., fl., fr., pistil).

DISTRIBUTION.—China: Yunnan and Szechwan; in arid soils at high altitudes.

Yunnan: *Handel-Mazzetti 696* (type of *A. paupera;* photo of fruiting specimen only; A); *Maire* (portion of type; A); *Maire* (cotype *Wikstroemia Hemsleyana;* A).

Szechwan: *T. T. Yü 1344* (Hai-Chang Hsien; fl. and fr.; A).

Cotypes of *Wikstroemia Hemsleyana.*—"Yun-Nan: rochers de Ta Tchai 500 m.; rochers derrière Kiao-Kiao 450 M., montagnes de Mo-Tsou, 800 m., avril-juillet 1911, 1912 (*E. E. Maire*)."

Type of *A. paupera.*—"Prov. Yünnan: Eiusdem ditionis im rupestribus aridis infra vicum Tschenminte ca. 1300 m, legi 18. III. 1914." The label of the type gives the collection number *696* and has the following data: "In faucium fluvii Djinscha-djiang ("Yangste-kiang") ad viam directam inter Yünnanfu et Huili regione subtropica, in valle torrentis inter vicos Homöndschang et Bödschagwan. Substr. conglomerato rupium; alt. s. m. ca. 1550 m." Tsiang (1936: 139) places the species in synonymy of *A. Mairei*; he does not indicate whether he examined the type.

13. **Alstonia Curtisii** King & Gamble, in Jour. As. Soc. Beng. 74 (2): 439. 1907.

Closely resembling *A. Mairei;* lateral nerves of leaf blades 35–50 pairs; inflorescence more sparsely flowered than that of *A. Mairei*; calyx lobes not ciliate; corolla tube about 3 cm. long, inflated at about one-fourth below mouth and characteristically constricted at throat for a length of about 5 mm.; anthers about 2.8 mm. long, their tips reaching 5–6 mm. below mouth.

TYPE.—"Kasoom: limestone islands, *Curtis 3242.*"

DISTRIBUTION.—Malay Peninsula: Lower Siam: *Curtis 3242* (type coll.; fl. and fr.; K, Sing).

14. **Alstonia rupestris** Kerr, in Kew Bul. 1937: 43. 1937.

Blaberopus rupester Pichon, in Bul. Mus. d'Hist. Nat., Paris, II, 19: 300. 1947.

Leaves closely resembling those of *A. Curtisii* but sessile. Inflorescence rather crowded, the pedicels comparatively short (up to about 3 mm. long); calyx lobes not ciliate; corolla tubes about 7–8 mm. long; corolla lobes 2.5 mm. long; anthers 1.4 mm. long (only buds seen); lobes of gland almost as broad and as long as the ovary; cilia of seeds brown.

TYPE.—"Doi Chiengdao, c. 1800 m., on limestone rocks in open evergreen forest, *Kerr 5560* (type), *Put 366.*"

Siam: *Kerr 5560* (type coll.; fl.; BM, K); *Put 366* (fr.; A, BM).

15. **Alstonia yunnanensis** Diels, in Bot. Gard. Edin., Notes 5: 165. 1912.

Alstonia Esquirolii Léveillé, Cat. Pl. Yun-Nan 10. 1915.

Acronychia Esquirolii Léveillé, Fl. Kouy-Tcheou 374. 1915.

Shrubs 1–3 m. tall. Petioles very short or none. Leaf blades lanceolate, 7–18 cm. long and 2.5–4 cm. broad, hispidulous-pubescent beneath (at least along nerves); lateral nerves comparatively few and distantly spaced, 20–30 pairs, 2–5 mm. apart. Inflorescence short-peduncled (peduncles 0.5–1 cm. long), small, about 2 cm. long and about as broad, sparsely flowered, hispidulous, the pedicels up to 8 mm. long; calyx lobes long linear-acuminate from an ovate base, acute at apex, ciliate, otherwise glabrous or nearly so; corolla tube about 1 cm.

long, glabrous outside or with some scattered hairs on upper part; corolla lobes 3–6 mm. long and 2–3 mm. broad, acute at apex, ciliate; anthers 2–2.2 mm. long; stigma-apiculi about 0.5 mm. long; lobes of disc about length of ovary, 1.5 mm. long; follicles about 3–4 cm. long, sometimes lightly constricted at intervals. Seeds comparatively very thick (about 0.6 mm. thick), strongly and closely muricate, the cilia very pale brown.

TYPE.—"In woods on hills west of Yunnanfu. Alt. 7–8000 ft. Feb. 1905. *G. Forrest 592.* (From about the same locality also Ducloux, 20th Apr. 1904.)"

DISTRIBUTION.—China, Yunnan, and Kweichow; high altitude (reported from 1,600 m. to 2,000 m., rocky places, mountain slopes).

Yunnan.—*Maire 138* and *395* (Mi Tsao; A); *Henry 9779* (Meng Tzi Mts.; A, NY, US), *13244a* (Szemao; A, Mo, NY); *Handel-Mazzetti 6089* (near Yunnan Fu; A); *Forrest 16177* (A), *9930* (Koia Kuan Valley; BM, K, UC); *McLarren C. 173* (K); *Tsiang and Wang 16323* (Ta-p'o-chi, Kun-Ming; A); *Wang 72241* (Chen Kang Hsien; A), *62906* (Kun-Ming; A).

Kweichow.—*Esquirol 740* (type coll. *A. Esquirolii*; fl.; A); *Tsiang 8508.*

Type of *Alstonia Esquirolii.*—"Kouy-tchéou, août 1905 (*Jos. Esquirol 740*)."

Type of *Acronychia Esquirolii* (fide Rehder).—"China. Kweichou: ruisseau derrière Bo-ly et chemin de Kéou-tin, *J. Esquirol 3212,* June, 1911." Examined by Rehder (1934: 315) and Tsiang (1936: 138), who place it in synonymy of *Alstonia yunnanensis.*

§ MONURASPERMUM

Trees, sometimes 20–25 m. tall. Leaf blades more or less acuminate at apex, usually varying from completely glabrous to densely pubescent beneath, the lateral nerves usually 15–20 pairs, 5–10 mm. apart. Calyx lobes pubescent or at least ciliate; corolla tube 3–6 mm. long, the lobes bearded at base within with linear or clavate hairs; anthers 0.6–1.3 mm. long, located at middle or up to throat of corolla tube. Follicles long; seeds brown, 5–9 mm. long and 1–2 mm. broad, the cilia silky-maroon, variable in length, 5–18 mm. long; cotyledons narrow.

The leaves and fruits are often very similar in different species; flowers are necessary for precise identification.

Siam to the Solomon Islands; often common.

16. **Alstonia angustifolia** Wall. ex. A. DC., Prodr. 8: 409. 1844.

A. angustifolia Wall., Num. List n. 1650. 1829.

Amblyocalyx Beccarii Benth. in Hook., Ic. Pl. 12 (3d ser. 2): t. 1179. 1876.

? *Alstonia angustifolia* var. *elliptica* King & Gamble, in Jour. As. Soc. Beng. 74 (2): 441. 1907.

A. Beccarii Pichon, in Paris Mus. d'Hist. Nat. Bul. II, 19: 297. 1947.

Trees up to 20 m. tall. Petioles 1–2 cm. long; leaf blades 8–19 cm. long and 2–6 cm. broad, the lateral nerves about 15 pairs, 8–12 mm. apart. Inflorescence with branches and pedicels divaricate, closely pubescent; calyx tube about 1.2–1.3 mm. long, about 2 mm. or less broad; calyx lobes very densely tomentose outside and inside, usually spreading or reflexed; corolla tube 3–3.5 mm. long, densely tomentose outside; corolla lobes broadly rounded, 1.2–2.5 mm. long and 1.4–2.2 mm. broad, densely tomentose outside and inside; stamens inserted slightly above middle of corolla tube.

TYPE.—"*Wall. list 1650.* Singapore," 1822.

ILLUSTRATIONS.—Hook., Ic. Pl. (1876) 12: t. 1179 (as *Amblyocalyx Beccarii*; leafy br. and infl., fl., fl. analysis; representation of ovules as 2 per cell suspended from near apex is erroneous).

DISTRIBUTION.—Malay Peninsula, where frequent in the southern states, to Sumatra, Bangka, and Borneo; usually in moist places at low altitudes.

Malay States.—*Alvins 668* (Malacca; Sing); *Corner 21307* and *31452* (Johore; Sing); *Derry 1080* (Malacca; Sing); *Maingay 1066* (Penang; fl.; mixed with var. *latifolia*; GH, L); *Ridley*

10942 (Johore; Sing); *Sing. Field no. 34057* (Selangor; A); *C. Smith 18151* (Selangor; Sing).

Singapore.—*Anderson 140* (BM, K, L); *Baker 5660* (G); *Corner* (Sing); *Cantley 2789* (Sing); *Goodenough 2714* and *2716* (Sing); *Maingay 1070* (L); *Ridley 14138* (Sing), *2714* (L), *2716* (K), *2834* (BM, L, Sing), *6706* (Sing); *Wallich 1650* (1822; type coll.; fl.; G, K).

Sumatra.—Palembang: *Dumas 1533* (fl.; L); *Grashoff 974* (fl.; L).

Bangka.—*Grashoff 50* (fl.; L).

Borneo.—*Beccari 1628* (type coll. *Amblyocalyx Beccarii*; fl.; K), *3207* (Sarawak; fl.; K); *Boschproefst. 6320* (Mempawa; L); *Hallier 1622, B.2559* (Semitau); *Haviland 2064* (Sarawak; K, L, Sing), *2093* (Sarawak; BM, L, Sing); *Mjoberg* (Sarawak).

Type of *Amblyocalyx Beccarii.*—"Sarawak, Borneo, *Beccari 1628.*"

Type of *A. angustifolia* var. *elliptica.*—"Penang: *Curtis.*" King and Gamble write "Scarcely a variety, but the shape of the leaves is very distinct . . . elliptic . . . 3 to 4 in. long, 1.25 to 1.75 in. broad." Ridley (1923: 347) places the variety in synonymy of *A. latifolia.*

A. Guillaumin (1943: 55) writes that "*Alstonia angustifolia* (? *Parsonia angustifolia*)" truly exists in New Caledonia. It is very likely that his crediting *A. angustifolia* to New Caledonia is due to some confusion. The original description of *Parsonia angustifolia* Baillon does not suggest *Alstonia.*

16a. **Alstonia angustifolia** var. **annamensis** Monachino, var. nov.

A forma typica speciei tubo calycis brevissimo et corollis brevioribus (tubo 2.3–2.6 mm. longo) extus minus pubescentibus recedit.

TYPE.—*Poilane 5970,* Indo-China, Annam, prov. Phan Rang, Cana; received at herb. Paris in June, 1923. (Arnold Arboretum.)

Annam.—*Poilane 5970* (type; A, P), *6784* (massif de la Mère et l'Enfant) (fl.; A, NY), *10142* (Phan Rang; fl.; P).

VERNACULAR NAME.—Annam: *Cây lâc.*

16b. **Alstonia angustifolia** var. **latifolia** King & Gamble, in Jour. As. Soc. Beng. 74 (2): 441. 1907.

A. latifolia Ridley, Fl. Mal. Penins. 2: 347. 1923.

Petioles about 2.5 cm. long; leaf blades usually 6.5–8 cm. broad. Calyx lobes hardly spreading, sharper at apex than those of the typical form; corolla tube 4.5–5.5 mm. long; anthers 1–1.3 mm. long.

Cotypes cited: "Penang: *Maingay (K.D.) 1070/1, 1070/2; Curtis 2491; Fox 80; Ridley 9306; Stoliczka; King's Collector 1341.*"

LECTOTYPE.—*A. C. Maingay 1070/1,* Malay States, Penang; flowering.

DISTRIBUTION.—Malaya (principally in Penang) and the east coast of Sumatra.

Malay States.—Penang: *Corner 32451* (Sing); *Curtis 2491* (fl.; BM, Sing); *King's coll. 1637* (fr.; Sing); *Maingay 1070/1* (type; L); *Ridley 9356* (fl.; Sing); *Symington 28042* (fr.; Sing).

Malacca.—*Ridley 3189* (fr.; Sing).

Sumatra.—*Boschproefst. 2917* (Simeloengoen; fl.; L); *3843* (Silindoeng; fl.; L); *Rahmat Si Boeea 8534* (vincinity of Toemoean Dolok; fl.; A).

Ridley states that *A. angustifolia* var. *latifolia* is highly distinctive. In elevating the variety to specific rank he placed *A. angustifolia* var. *elliptica* in synonymy. Specimens cited by him: "Penang Hill (Maingay and others)."

This variety seems transitional to *A. spectabilis.*

17. **Alstonia parvifolia** Merrill in Philippine Bur. Gov. Lab. 35: 59. 1905.

Leaves and inflorescence like those of *A. angustifolia*; pedicels up to 4 mm. long; calyx more than 3–3.5 mm. long and about 2.5 mm. broad, the calyx tube 1.2–2.9 mm. long and 2.2–3.2 mm. broad, the calyx lobes densely tomentose outside and inside; corolla tube 4–4.7 mm. long, varying from glabrous to densely pubescent outside; corolla lobes oblong, (2.5–) 3.7–4.1 mm. long and 1.4–2.9 mm. broad, varying from glabrescent to sparsely pubescent,

usually streaked with brown; stamens inserted slightly above middle of corolla tube; anthers 0.7–1.3 mm. long.

TYPE.—"Type specimen: Mount Mariveles, Province of Bataan, Luzon (*2209 Meyer*), Nov. 1904 (flower). From the same locality: (*6876 Elmer*) Nov. 1904 (fl.); (*1164 Whitford*) Mar. 1905 (fr.)."

DISTRIBUTION.—Philippines (principally in Luzon); a transitional form in northeast Borneo.

Philippines.—Luzon: *Borden 24037*; *Clemens 51889* (A); *Elmer 6876* (G, NY, K); *Loher 6512* (K), *12551* (UC), *13498* (A); *Meyer 27198* (*For. Bur. 2209*; type coll.; K, NY, US); *Ramos* (*Bur. Sci. 26985*); *Ramos and Edano* (*Bur. Sci. 48553*); *Whitford 1164* (K, NY, US). Negros: *Elmer 9690* (fl.; A, F, G, K, L, Mo, NY, L).

British North Borneo.—Mt. Kinabalu: *J. and M. S. Clemens 28673* (A), *28673a* (A, G, L, UC).

This species clearly displays affinity to *A. angustifolia.* The specimens from Borneo have their corolla lobes more pubescent within and more markedly ciliate on the margins, and are not streaked. They are transitional to *A. angustifolia.*

18. **Alstonia spectabilis** R. Br., in Mem. Wern. Soc. 1: 76. 1811.

A. villosa Blume, Bijdr. Fl. Ned. Ind. 16: 1038. 1826. Non Seem., Fl. Vit. 161. 1866.

Blaberopus villosus Miq., Fl. Ind. Bat. 2: 440. 1856.

B. villosus var. *β petiolata* Miq., Fl. Ind. Bat. 2: 440. 1856.

? *Alstonia longissima* F. v. Muell., Papuan Plants 91. 1877.

A. villosa var. *β glabra* Koord. & Val., in Mededeel. Uit 'sLands Pl. 11 (Bijdrage 1): 123. 1894.

A. somersetensis F. M. Bailey, in Queensl. Agric. Jour. 1: 229. 1897.

? *A. villosa* forma *calvescens* Markgraf, in Bot. Jahrb. 61: 178. 1927.

Trees up to 40 m. tall. Leaves resembling those of *A. macrophylla,* usually 3-verticillate; petioles 0–2 cm. long; leaf blades 10–30 cm. long and 2.5–9 cm. broad, varying from glabrous to densely villose beneath, the lateral nerves 18–25 pairs, 6–12 mm. apart. Ultimate branches and pedicels of inflorescence usually ascending, not divaricate; the pedicels short, less than 3 mm. long; calyx lobes variable in size, 0.9–2.5 mm. long, tomentose outside, essentially glabrous inside; corolla tube 3–3.6 mm. long, tomentose outside; corolla lobes ovate to orbicular, 1.5–3 mm. long, pubescent outside and inside; stamens inserted at about ¼ from throat of corolla tube, the anthers 0.9–1.3 mm. long.

TYPE.—"insula Timor prope Coepang, cum floribus fructibusque Aprili 1803 Observavi . . . Praecedenti [*A. scholaris*] quam maxime affinis, sed revera distincta, nec male ab icone cit. Rumphii repraesentata." Type material was not located at the British Museum. Although the interpretation of the species rests principally on the Timor collections cited, there is little doubt that Brown's plant is here correctly placed. *A. scholaris* is also found on Timor, but Brown's comments and description ("foliis quaternis elliptico-oblongis sub-acuminatis costatis: margina simplicibus . . .") definitely preclude confusion of the two. Although there is no record of *A. macrophylla* in Timor, judging by the distribution-range this species or a variety might be expected there; in any case, the inflorescence habit and flowers of *A. macrophylla* are so strikingly different from *A. spectabilis* and *A. scholaris* that there need be no fear of its being the original species Brown had in mind. The only other known species that conceivably might be involved is *A. angustiloba,* which is known from Java; this species is very similar to *A. scholaris* and is excluded for like reasons. Brown states that the illustration in Rumphius (1741: t. 82) is not a bad representation of *A. spectabilis.* The leaf blades pictured, their shape and acute apex, their few (12–15 pairs) lateral nerves, which are dis-

tant and arcuate entirely unlike those of *A. scholaris* and *A. angustiloba,* are assuredly good for *A. spectabilis* whether or not they actually represent that species.

ILLUSTRATIONS.—Koord. and Val., Atl. Baumart. Java (1916) t. 641 (as *A. villosa*; veg., infl., fr., seed, habit of tree). F. M. Bailey, Compr. Cat. Queensl. Pl. (1913) 324 (as *A. somersetensis*; veg., infl., fr., seed). Meded. Proefst. Thee (1926) 97: t. 29, fig. 114 (as *A. villosa*; wood anatomy).

DISTRIBUTION.—Second only to *A. scholaris* in amplitude of distribution range; Java and the islands of the Javanese Archipelago, Celebes, the Moluccas, north to the Philippines (Mindanao), east to New Guinea and the Solomon Islands, and south to Queensland. Often common in rain forests of low altitudes (reported up to 450 m.).

Java.—*Beumee A327* (Batavia; L); *Blume 1006* (type coll. *A. villosa*; L); *Elbert 355* (Madioen; L); *Hallier f. 46* (cult., IV–A–82; L), *47* (Hort. Bog. ex Timor; L); *Horsfield* (type coll. *Blaberopus villosus* var. *petiolata*; K); *Koorders 83* (K), *87* and *88* (L), *90* (Besoeki; L), *93* (K), *97* (L), *12302* (Preanger; K, L, UC), *12333* and *13071* (L), *13372* (Pekalongan; L), *14237* (Pekalongan; L, P), *15710* (Preanger; K, L), *27296* (K), *28203* (Semarang; L), *30222* (K, L), *34148* (Semarang; L), *36884* (Pekalongan; L), *38895* (Besoeki; L); *Merrill* (Buitenz. Gd.).

Kangean.—*Backer 27816, 27966* and *28154* (L), *28958* (Sepandjang; K, L).

Lombok.—*de Voogd 2062* (A).

Soemba.—*Iboet 9* (Bri, K, L), *266* and *484* (L); *Boschproefst. 15141* (L).

Timor.—*A. Cunningham 334* (BM, K, L); *Neth. Ind. For. Serv. 27137* (Mo); *Ex Herb. Mus. Paris* (1827; fl.; G, K, L, NY, P, US); *Riedel* (Com. A. Billeger; fl.; K).

Tanimbar.—*Neth. Ind. For. Serv. 24391* (A).

Aroe.—*Neth. Ind. For. Serv. 25351* and *25411* (A).

Kai.—*Jensen 412* (L).

Celebes.—*Boschproefst. 44* (L), *458* (K, L, Sing), *3685* and *5849* (L); *Neth. Ind. For. Serv. 210* and *22984* (A).

Philippines.—Mindanao: *Clemens 696* (fl.; G, F. US); *Elmer 10840* (fl.).

Papua.—*Brass 507* (Kappa Kappa; A), *1632* (Sandbank Bay; A), *3643; Burke 296* (coll.?; between s. coast of Owen Stanley Range; K); *Carr 11399* (Hisiu); *D'Albert* (type *A. longissima,* photo only; det.?); *Lane-Pool 103* (Buna; Bri); *C. T. White 13* (Port Moresby; K), *16* (Post Moresby; Bri).

Australia.—Queensland: *F. L. Jardine* (type coll. *A. somersetensis;* Sept. 1897; fl.; Bri, K).

Thursday Island.—*Vidgen 143* (1 leaf only; Bri).

Northeast New Guinea.—*Dadswell et al. (N.G.F. 1741;* Lae; Bri; det.?); *Waterhouse 371* (Kabakada, north coast of Gazelle Pen.).

Solomon Islands.—Bougainville: *Kajewski 1834* (A); *N.G.F. 579* (Bri); *Waterhouse 78* (fl.; K, NY, US), *341* (fl.). Guadalcanal: *Kajewski 2449* (A); *Walker (B.S.I.P. 8*; Bri); *C. T. White (B.S.I.P. 50*; Bri). Banika: *Stoddard 33* (A). San Christoval: *Brass 3014* (A).

VERNACULAR NAMES.—Java: *Baloeng, Ilat-Ilat, Langkerang, Legarang*; Timor: *Polé*; Papua: *Oli*; Bougainville: *Melu*; Guadalcanal: *Vulei-Kuku.*

Type of *A. villosa.*—"Monticulos calcareos Kuripan," Blume. The type specimen has very large, sessile, densely pubescent leaves, whereas the Timor plant has small, petioled, glabrous leaves; but the many excellent series of collections from Java link the two forms with numerous intermediates. The varieties proposed reflect this intergradation. It has not been feasible for me at the present time to recognize even varieties in this polymorphic species; sight is not lost, however, of the possibility that field studies may eventually define several subspecific entities. The Java specimens, in general, have hairy leaves which are shorter petioled and larger than the Timor form.

Type of *Blaberopus villosus* var. *petiolata.*—"Java, in Blambangan (Hors F.)."

Type of *A. longissima.*—"Fly-River; D'Albertis." Papua, 1876, No. 6424 in herbarium of R. Inst. studi Sup. Firenze. Described as glabrous, with very short petioles, leaf blades (ex photo of type) up to 24 cm. long and 8 cm. broad. With a close examination of its pedicels and remnants of calyx lobes it may be possible to place this species in its proper position with greater confidence.

Type of *A. villosa* var. *glabra.*—"Ex insula Noesabaroeng tantum nobis cognita."

Type of *A. somersetensis.*—"Near Mr. Jardine's house, Somerset."

Specimens cited by Markgraf (1927) as *A. villosa* f. *calvescens.*—"Bismarck-Archipel: Neu-Pommern, ohne Fundort, fruchtend i.J. 1901—*Parkinson 1*; Gazella-Halbinsel, in den Wäldern des Baining-Gebirges, steril Sept. 1905—*Rechinger 3989* (Naturhis. Mus. Wien); Simpsonhafen, im Sekundärbusch, blühend und fruchtend 16 Sept. 1908—*Rudolph 15* (einh. Name: *a ituwe*): Matupi, blühend Okt. 1901—*Schlechter 13684*; ebenda, blühend und fruchtend Sept. 1905—*Rechinger 4114* (Naturhist. Mus. Wien). Neu-Mechlenburg, Namatanai, bei Salosalo auf Schwemmland, blühend und fruchtend 15 Juni 1910—*Peekel 460* (einh. Name; *a ituh*). Kei-Inseln: Kei keteil a tual, mit Blütenknospen und Fruchten. Aug. 1873—leg. *Beccari* (Herb. Florenz *6413*)." I have not seen any of these collections. Judging from his annotated determinations of Queensland specimens and his published synonymy Markgraf's concept of *A. villosa* includes *A. Muelleriana.* Therefore there is ground for doubt regarding the true position of this form. Markgraf noted that his form was not *A. villosa* var. *glabra,* as the leaves of the latter were said to be hardly separable from those of *A. angustifolia,* a species which unlike the New Guinea plant has small narrow leaves. As Markgraf observed, the typical leaves of *A. spectabilis* are larger than those of *A. angustifolia,* but there are frequent examples of small leaves in this and in all the other large-leaved species in the genus. Leaf size is not a dependable character in *Alstonia.*

19. **Alstonia ophioxyloides** F. Muell., Fragm. 1: 57. 1858.

Petioles 1.5–2.5 cm. long; leaf blades 6–12 cm. long, pubescent beneath, the lateral nerves about 25 pairs, 3–6 mm. apart. Inflorescence and flowers like those of *A. spectabilis* except that the indumentum on the pedicels and calyces is of more loosely disposed and more spreading hairs.

ORIGINAL CITATION.—"Ad ripas fluviorum et clivos rupestres terrae Annhemicae."

LECTOTYPE.—*F. Mueller s. n.,* Fitzmaurice Rv. (Gray Herbarium).

DISTRIBUTION.—Australia: Northern Territory: *F. Mueller* (lectotype; fl.; K, GH), *F. Mueller* (Victoria Rv.; fl.; K).

20. **Alstonia Muelleriana** Domin, in Biblioth. Bot. 22 (Heft 89): 527. 1928.

A. Muelleriana var. *parvifolia* Domin, in Biblioth. Bot. 22 (Heft 89): 1081. 1928.

Trees up to 20 or 25 m. tall. Leaves usually 3-verticillate; petioles 0–2 cm. long; leaf blades usually 9–18 cm. long and 3–8 cm. broad, varying from glabrous to densely villose beneath, the lateral nerves 14–17 pairs, 5–13 mm. apart. Inflorescence with numerous crowded flowers, the pedicels short, ascending; calyx turbinate, tomentose outside, the calyx lobes ovate to lanceolate, densely pubescent outside and inside, not reflexed; corolla tube about 2.5 mm. long, tomentose outside, corolla lobes linear- to oblong-lanceolate, about 3 or 4 times longer than broad, 2.2–4 mm. long; stamens inserted slightly above middle of tube, the anthers 0.9–1.1 mm. long.

TYPE.—"Endemisch in Nordost-Queensland.-Regenwalder bei Lake Eacham und Yarraba (Domin II. 1910). *A. villosa* F. v. Muell. Fragm. VI. 117 (1868). . . . Cf. descriptionem apud Bentham Fl. Austr. IV. 313 (1869)."

DISTRIBUTION.—Northern Australia and in Papua. Frequent in the northern part of Queensland; probably grows also in the Northern Territory. Rain forests and sometimes in savannas, usually at low altitudes (reported up to 800 m.).

Australia.—Queensland: *F. M. Bailey* (Granite Creek; Bri), *121* (Bellenden Ker Hills; Bri); *J. F. Bailey* (Cook Dist.; Bri); *Blake 14750* and *15263* (Cook Dist.; Bri); *Brass 1953* and *2529* (A); *Cowley 98D* (Cook Dist.; Bri); *Dallachy* (Rockingham Bay; GH); *Doggerell* (Kuranda; A), *A37* (Cook Dist.; Bri); *Helms 1224* (A); *C. T. White 11726* (Cook Dist.; A); *Kajewski 1080* and *1469*; *Michael 638* (GH); *C. T. White* (Mourilyan; A).

Papua.—*Brass 5761* (A, NY), *6563* and *7953* and *8172* and *8373* and *8493* (A).

The Queensland material which has generally been known as *A. villosa* is closely related but clearly distinct from the Blume species (here referred to *A. spectabilis*). Mueller did not accept it without reservation as identical with *A. villosa*; its distinctive character was first noted by Koorders and Valeton (1894: 123).

Type of *A. Muelleriana* var. *parvifolia*.—"Savannenwälder am Waterfall Creek bei Yarraba (Domin I. 1910)." The smaller leaves ("5–8 cm. longis et 1.5–2 cm. latis") which characterize this variety are not diagnostic.

21. **Alstonia macrophylla** Wall. ex. G. Don, Gen. Syst. 4: 87. 1837.
   A. macrophylla Wall., Num. List 1648. 1829 (nom. nud.).
   A. costata Wall., Num. List 1649. 1829 (nom. nud.); Wall ex. Miquel, Fl. Ind. Bat. 2: 439. 1856. Non R. Br. 1811.
   A. macrophylla β *glabra* A. DC., Prod. 8: 410. 1844.
   A. Batino Blanco, Fl. Filip. ed. 2, Suppl., 589. 1845.
   A. pangkorensis King & Gamble, in Jour. As. Soc. Beng. 74 (2): 442. 1907.
   ? *A. paucinervia* Merrill, in Philip. Jour. Sci., Bot. 5: 224. 1910.
   A. oblongifolia Merrill, in Philip. Jour. Sci., Bot. 10: 65. 1915.
   A. macrophylla var. *mollis* Merrill, Enum. Philip. Pl. 3: 322. 1923.

Trees usually 10–20 m. tall. Leaves like those of *A. spectabilis*, usually 4-verticillate. Inflorescence profusely flowered, divaricately branched, the pedicels long, up to 4 mm. long, slender (about 0.3 mm. diam.); calyx less than 1.5 mm. long, gray-puberulent to glabrous; calyx lobes usually 0.4–1.3 mm. long, ciliate, inside slightly puberulent near apex or glabrous; corolla tube 4.5–6 mm. long, glabrous outside or very sparsely pubescent toward upper part; corolla lobes 3.7–5.7 mm. long, ciliate; stamens inserted about ¼ from throat of corolla tube, the anthers about 1 mm. long.

TYPE.—"Native of Penang. Wall. Cat. no. 1648."

ILLUSTRATIONS.—Colthurst, Familiar Fl. Trees in India (1924) 92 (photo of leafy br. and infl.); Ahern, Philippine Woods (1901) 33 (leafy br. and infl., fl., frs.); Vidal, Fl. For. Filip. Atlas (1883) t. 66, fig. A (leafy br. and infl., fl. analysis, fr.); Lecomte, Fl. Gen. Indo-Chine (1933) 3: 1133, fig. 130 (fl., fl. analysis); Wettstein, Handb. Syst. Bot., ed. 2 (1911) p. 462, abb. 317, fig. 9 (seed); Ettingshausen, Blatt-Skel. DiKot. (1861) t. 30, fig. 4 (leaf skeleton).

DISTRIBUTION.—Siam and the Malay Peninsula to Indo-China and throughout the Philippines; also in Borneo, and probably in Sumatra, Biliton, and Celebes.

Siam.—*For. Dept. Siam 13*; *Kerr 11439* (A), *12732* (Surat; A), *14792* (A), *19248* (Patalung; A); *Put 697* (Kow Samui; Mo).

Indo-China.—*Poilane 882* (Hatien; A).

Philippines.—Balabac: *Bur. Sci. 15654* (L), *49678* (UC). Cebu: *For. Bur. 6410* (Mo). Guimaras: *For. Bur. 250.* Luzon: *Ahern 75* (US); *Bur. Govt. Lab. 219*; *Bur. Sci. 1084* (G, US), *1895, 27220* (A), *44692; Cuming 505, 782* (G, L, Mo, P); *Elmer 14468* and *15515*; *For. Bur. 3151* and *3424* and *7113* and *8322, 17128* (type coll. *A. m.* var. *mollis*; L), *17903* (A), *18726* (type coll. *A. paucinervia;* US), *19806* (F), *23535* (A), *23855* (UC), *24811* (A), *24985* (GH), *25032* (A), *25455* (A), *30201* (Bri, UC); *Gates 6993* (F); *Loher 3883* (US), *4020, 4021* (US); *Merrill Sp. Blancoanae 335, 659; Sulit 60; Whitford 652, 864.* Minda-

nao: *For. Bur. 29612* (UC). Mindoro: *Bur. Sci. 39586* (A), *46440* (A); *Merrill 2378* (US). Palawan: *Curran 4495* (type coll. *A. oblongifolia*; K, NY, US); *Elmer 12929*; *For. Bur. 29279* (A). Panay: *For. Bur. 23956* (Mo). Romblon: *Elmer 12157*. Sibutu: *Herre 1201, 1202* (A).

Malay States.—*Corner* (Trengganu; Sing); *Curtis 378* (Penang); *Maingay 1066/2* (L), *1070/2* (GH); *Scortechini 1024* (type coll. *A. pangkorensis*; fr.; Cal); *Sing. Field No. 252* and *31950* (Penang; Sing), *33422* (Kelantan; Sing); *Wallich 1649* (Penang).

British North Borneo.—*Balajadin 4030* (Kudat; Sing); *For. Dept. Sandakan 3680* (UC); *Villamil 348* (A); *Castro and Melegrito 1492* (Banguey; A).

Sumatra.—*Boschproefst. 5250* (Tapanoeli Silindoeng; sterile; L).

Biliton.—*Herb. Biliton 84* (sterile; L).

Celebes.—*Koorders 16041, 16042, 16044, 19745* and *24068* (Minahassa; sterile; L).

Java.—*Brink 5399* (Batavia; L); *Hort. Bot. Bog. 286* (cult.; US); *Merrill* (cult. IV-A-65).

India.—*Haines 3994* (Paraganas; prob. cult.; K).

Mauritius.—*Horne* (cult.; K).

VERNACULAR NAMES.—Philippine Islands: *Batino, Cayacayao*; Annam: *Cay So Dua*; North Borneo: *Bakau*.

Type of *A. macrophylla β glabra*.—"Insula Penang. *A. costata* Wall. list n. *1650*" (error for *1649*). Don first called attention to this plant: ". . . does not appear to differ from *A. macrophylla*, unless in the leaves being glabrous, narrower, and the veins more distinct." De Candolle assigned a varietal name to it on basis of Don's comment. Examination of the numerous collections now available make it obvious that the characters given for this variety do not hold. The leaves of the type collection are not entirely glabrous but faintly pubescent along the veins on the underside.

A. Batino, described from the Philippines without citation of type, is referred with propriety to *A. macrophylla* by Merrill. Blanco's *Echites trifida*, which was a misapplication of Jacquin's name, is also referred with certainty to *A. macrophylla* by Merrill.

Type of *A. pangkorensis*.—"Dindings: Pangkor Island, *Scortechini 1024*." Described from a fruiting specimen and placed under "Species of Doubtful Position" by King and Gamble, the type apparently represents old leaves, greatly enlarged and with lateral nerves more distant and the veins more boldly raised than is usual for *A. macrophylla*. The calyces and pedicels, as well as the fruits, are characteristically those of *A. macrophylla*.

Type of *A. paucinervia*.—"Luzon, Province of Camarines, Paracale, *For. Bur. 18726 Darling*, Mar. 19, 1910, in forests at an altitude of about 70 m., locally known as *batino*." Flowering material from New Guinea (in the present paper named *A. Brassii*) has been identified by Markgraf as belonging to this species. The vegetative and fruiting characters of the Philippine type and the New Guinea plants are very similar, but not reliable. It is most likely that *A. paucinervia* is merely an atypical form of *A. macrophylla* as Merrill himself suggested.

Type of *A. oblongifolia*.—"Palawan, in old clearings near Puerto Princesa, *For. Bur. 4495 Curran*, June 5, 1906." It seems that because of its small leaves the type was originally compared with *A. angustifolia*. The flowers are typically those of *A. macrophylla*, which not infrequently also has small leaves.

Type of *A. macrophylla* var. *mollis*.—"*F. B. 17128 Curran*." As pointed out by Markgraf (1927: 178) the type of the species is the pubescent form.

Forbes and Hemsley (1889: 95) cite, from Yunnan, an *Alstonia* sp. "allied to *A. macrophylla* Wall., but apparently different . . . (*Anderson!*) herb. Kew." I have seen from Yunnan only species in the § *Blaberopus*.

It has been estimated (*fide* Macmillan) that 1,000 seeds of *A. macrophylla* weigh less than a gram.

21a. **Alstonia macrophylla** var. **acuminata** (Miq.) Monachino, stat. nov.

"Cofassus Citrina" Rumph., Amb. 3: 30. t. 15. 1743.

A. acuminata Miq., in Ann. Mus. Bot. Lugd. Bat. 4: 140. 1869.

A. subsessilis Miq., in Ann. Mus. Bot. Lugd. Bat. 4: 140. 1869.

The calyx lobes are usually more than 1 mm. long, sharper at apex than those of the typical form, ciliate, otherwise glabrous; anthers about 1.1 mm. long. In the material examined the leaves are glabrous and their veins are more boldly raised than is usual for the typical form; the flowers are in poor condition.

TYPE.—"Amboina: et forma foliis anguste ovatis obtuse acuminatis in Ceram: *Teysmann.*"

DISTRIBUTION.—Apparently confined to Amboina and Ceram. The typical species is possibly found in Celebes to the west, and *A. Brassii,* which is very closely allied to *A. macrophylla,* is in New Guinea to the east; otherwise this variety is distantly isolated from the principal range of the species and there is no other relative from which it might have been derived.

Amboina.—*de Fretes 5574* (type coll. *A. subsessilis;* L); *de Vries and Teysmann* (type coll. *A. acuminata;* L); *Neth. Ind. For. Serv. 25995* (A); *Robinson Pl. Rumph. Amb. 77* (GH, K, L, NY, US); *Teysmann* (*Herb. Bog. 5166;* K).

Ceram.—*de Vries and Teysmann* (L).

Java.—*Hallier f. 43* (cult., Hort. Bot. Bog. IV–A–55; L); *Merrill* (IV–A–55; NY, US).

VERNACULAR NAMES (*fide* Heyne).—*Ajoeran, Aoeran, Oeken, Poele Batoe, Pole.*

"Cofassus Citrina" was referred to *A. acuminata* by Heyne (1917: 63) and to *A. subsessilis* by Merrill (1917: 427). Although Rumphius' illustration is poor and his description is not definitive, there is fair circumstantial evidence in favor of accepting this identity. Rumphius states that the plant is rare and presents the following distribution: "Hitoe circa pagum Lima, & in Leytimora in montibus Oerimissen, item in Java & Baleya."

Type of *A. subsessilis.*—"Amboina ubi Poelek-batoe vel Lassi oetan vocatur: *De Fretes.*" It consists of sterile material and is characterized chiefly by its subsessile leaves. Flowers are present in *Herb. Bog. 5166,* which has the leaf character of this form.

Merrill pointed out that IV–A–55 cultivated in the botanic garden at Buitenzorg under the unpublished name of *"Alstonia hoedti* T. & B.," reported to have originated from Amboina, is apparently identical with *A. subsessilis;* Dakkus (1930: 17) names the plant *A. acuminata.*

22. **Alstonia Brassii** Monachino, sp. nov.

A. macrophyllae perintime affinis sed foliis glabris, pedicellis brevioribus crassioribusque minus quam 3 mm. longis, calcye ca. 2 mm. longo, lobis plus quam 1.5 mm. longis extus glabris vel glabrescentibus; staminibus prope mediam tubi corollae insertis.

Trees 18–24 m. tall. Petioles 0–1 cm. long; leaf blades usually 12–18 cm. long, 4–8 cm. broad, glabrous, the lateral nerves 15–20 pairs, 8–15 mm. apart. Inflorescence sparsely to profusely flowered, the ultimate branches less spreading than those of *A. macrophylla;* pedicels less than 3 mm. long, more robust than those of *A. macrophylla,* about 0.5 mm. in diameter; calyx about 2 mm. long, glabrous or nearly so; calyx lobes glabrous or glabrescent outside; glabrous inside, ciliate; corolla tube about 5.6–5.7 mm. long, glabrous or very sparsely pubescent outside; corolla lobes 4.7–7 mm. long, varying from well-ciliate to eciliate; stamens inserted slightly above middle of corolla tube, the anthers 1–1.3 mm. long.

TYPE.—*L. J. Brass 5138,* Papua, Mafulu, Central Division, forests of middle and lower slopes, altitude 1,250 m., very abundant; Sept. 30, 1933. (Type, NY. Bot. Gd.; isotype, Arnold Arboretum.)

DISTRIBUTION.—The entire island of New Guinea; sometimes common. Reported from forests at altitudes of 180–1,800 m.

Papua.—*Brass 630* (Bisiatabu; A), *5138* (type coll.); *H. O. Forbes 125* (Sogeri Region; BM, K, L).

Northeast New Guinea.—*M. S. Clemens 862* (Morobe District, Sattelberg; A), *124* and *4567* (Morobe District; A); *Schlechter 16255* (Kaiser-Wilhelmsland, Wobbe; A, Bri, F, G, L), *19663* (Kaiser-Wilhelmsland, Dischore; A, Bri, F, G, K, L); *For. Herb. N. Guinea 571* (Joangey; Bri; "*Qweta*").

Netherlands New Guinea.—*Neth. Ind. For. Serv. 30363* (Seroei, Japen; A).

The type has been identified by Markgraf (in herb.) as *A. macrophylla* var. *glabra,* and other specimens both as *A. macrophylla* var. *glabra* and *A. paucinervia* (Markgraf, 1927: 178, 179). The original variety, however, is not separable from typical *A. macrophylla,* with which the dubious *A. paucinervia* is probably also synonymous. The conclusion that *A. Brassii* is distinct from *A. glabriflora* is based almost solely upon the description of Markgraf's species. Markgraf examined all of the specimens here cited under *A. Brassii* and did not identify any of them with his *A. glabriflora.*

The type is noted as a tree up to 20 m. tall; sap milky; leaves glossy; flowers numerous, foetid, corolla tube pale pink, lobes cream-colored. C. T. White (1929: 260) describes *630* as a tall and slender laticiferous tree, 18–24 m. tall, 50–60 cm. girth, unbranched to near top, wide light-crowned.

23. **Alstonia glabriflora** Markgraf, in Bot. Jahrb. 61: 179. 1927.

Leaves small, 12–20 cm. long, glabrous. Calyx 2 mm. long, glabrous, the lobes erect, ciliate; corolla glabrous outside, the tube 4 mm. long, the lobes oval, 2 mm. long, twice as long as wide, at most two-thirds as long as tube, glabrous above, ciliate only toward the base; anthers inserted near throat, 1 mm. long. (Compiled from the original description.)

TYPE.—"Nordost-Neuguinea: Sepikgebiet, Felsspitze, im montanen Buschwald, 1400–1500 m. ü M., blühend 6 Aug. 1913—*Ledermann 12649.*"

24. **Alstonia linearis** Benth., Fl. Austral. 4: 314. 1869.

Branchlets very slender, 2 mm. or less in diameter, leaves narrowly linear, 4–9.5 cm. long and only 1.5–3 mm. broad, often falcate, lateral nerves about 40 pairs, about 1 mm. apart. Flowers not known.

COTYPES.—"N. Australia. Cliffs of Brunswick Bay and Regent's River, N.W. coast, *A. Cunningham.*"

LECTOTYPE.—*A. Cunningham s.n.,* Western Australia, north coast, cliffs of Brunswick Bay; fruiting, 1820. (Kew.)

DISTRIBUTION.—Known only from the original collections on the coast of the Kimberley Division of Western Australia.

Western Australia.—*A. Cunningham s.n.* (type), *204* (coll. no. ?; Regent Rv.; K).

§ DISSURASPERMUM

Shrubs or small trees, 1–15 m. tall, often of greatly varying sizes in the same species. Leaves opposite, except in *A. Legouixiae* (and *A. saligna?*) where 3-verticillate as well as opposite; petioles manifest, slightly dilated at base; blades usually more or less elliptic and cuneate at base, sometimes coriaceous, the reticulation manifest except in the thickly coriaceous leaves. Calyx lobes ovate, usually 0.6–2 mm. long and 1–2 mm. broad, obtuse to somewhat acute at apex, rarely ciliate (*A. constricta*), otherwise glabrous; corolla tube short, mostly 2–5 mm. long, glabrous outside or rarely minutely puberulent; corolla lobes mostly longer than corolla tube, usually glabrous outside, rarely manifestly ciliate, sometimes with very faint sparse microscopic cilia; stamens inserted mostly at about middle of corolla tube; anthers generally 0.7–1.5 mm. long; ovary glabrous, the style short, usually 0.5–1.5 mm. long. Follicles slender, glabrous; seeds usually with a more or less elliptic body which is lightly pubescent on faces, generally about 2 mm. broad, the tails varying from entire to lightly lobed to deeply bifurcate.

Representatives of this section are common from Australia to the far eastern Pacific.

In the Pacific islands east of New Caledonia, starting from the New Hebrides and extending to the Marquesas, there are only two clearly dis-

tinct species, *A. costata* and *A. vitiensis*. Between them there is a long series of closely intergrading polymorphic forms weakly grouped around vague foci. These form-groups are hardly definable except as overall tendencies toward either the long-tailed seeded *A. vitiensis* or the short-tailed seeded *A. costata;* they appear to be best associated with ecological–geographical factors. Insular distribution here seems to have a marked influence on morphological modifications of the species. Except for seed structure, in which moderate trust may be placed, no single morphological character is dependable. Flowers of the different species or varieties are essentially uniform, variations being more of an individual nature rather than diagnostic; vegetative features are inconstant and serve merely to describe typical specimens. For convenience, four species and two varieties are here recognized; there are frequent examples of doubtful intermediates. The extreme polymorphy in the species of the *costata–plumosa* series recalls the similar phenomenon observed in the "*obovata*-group" of *Planchonella*. See the interesting discussion of *Planchonella* and *P. sandwicensis* by H. J. Lam (1942: 3, 16). The variations in flower dimensions, length of corolla tube, and length and width of corolla lobes, and variations in degree of pubescence within the corolla lobes are profound and disconcerting. Extensive field and statistical studies accompanied by vast series of specimens are necessary for their proper evaluation.

25. **Alstonia constricta** F. Muell., Fragm. 1: 57. 1858.

A. mollis Benth., Fl. Austral. 4: 315. 1869.

A. constricta var. *mollis* F. M. Bailey, Synopsis Queensl. 308. 1883.

A. constricta var. *montmariensis* F. M. Bailey, in Queensl. Fl. Agr. Jour. 26: 198. t. 19, fig. 3. 1911.

Petioles 2–4 cm. long; leaf blades very variable in shape, width, and pubescence, narrowly lanceolate to broadly elliptic, often falcate, 9–15 cm. long, (0.5–) 1–6 cm. broad, acuminate or narrowed and usually acute at apex, varying from velvety-villose on both sides to entirely glabrous, the lateral nerves 13–16 pairs, 5–7 mm. apart, strongly arcuate and ascending. Inflorescence velvety-villose to glabrous, flowers rather crowded, pedicels very short (2 mm. long or less); calyx lobes ciliate; corolla tube 2.3–3.6 mm. long, densely papillose at throat inside; corolla lobes ligulate, 7–9 mm. long, sparsely pubescent above the bearded base within, sparsely ciliate. Follicles 6–20 cm. long; seeds lanceolate, 7–12 mm. long and 2–3 mm. broad, narrowed at both ends, hardly caudate, usually with a shallow sinus at one or both ends, the cilia short, up to about 2 mm. long, light brown.

COTYPES.—"Prope montem Pluto. *Thom. Mitchell, Eques.* In pratis basalticis inter flumina Burdekin et Burnett."

LECTOTYPE.—*T. L. Mitchell 261,* Queensland, Mt. Pluto.

ILLUSTRATIONS. — Queensl. Agr. Jour. (1911) 26 (4): t. 19; also Bailey, Compr. Cat. Queensl. Pl. (1913) 323 (leafy br. and infl., fr.); loc. cit. (as var. *mollis;* leafy br. and infl., fl. analysis); loc. cit. (as var. *montmariensis;* leafy br. and infl.); Agr. Gaz. N. S. Wales (1908) 19: 106 (photo of entire tree showing habit).

DISTRIBUTION.—Australia, frequent in Queensland and New South Wales. Reported from monsoon forests, sandy country, scrub, secondary growth, and roadsides; said to be somewhat of a pest in cultivated grounds.

Queensland.—*F. M. Bailey* (Warrego; Bri), (type coll. var. *montmariensis*; fl.; Bri, K); *Bancroft* (Eidsvold; 1910; Bri); *Bick* (Roma; Bri); *Blake 14791* (Port Curtis; Bri), *15299* (Sellheim; Bri), *15358* (Biloela; Bri); *Bowman* (Nerkool Creek; fr.; K); *Brass and White 25* (Warrengo; A); *M. S. Clemens* (Charleville; Bri); *Everist 796* (Maranoa; A), *2156* (Blackall; A); *Fitzalan* (Natal Downs; K); *W. D. Francis* (Bingegong; Jericho; Bri); *Grove 138* (Nanango; Bri); *Helms 1243* (A); *Jensen* (Dividing Range; Bri); *Keys 725* (Mt. Perry; Bri); *Longman* (Forest Gate; K); *MacGillivray 1017* (Charleville; Bri), *2187* (Bar-

coo Rv.; Bri); *Mitchell 261* (type; K), *323* (K), *368* (type coll. *A. mollis*; fl.; K); *F. Mueller* (bet. Burdekin and Burnett Rvs.; fl. and fr.; K); *Murray 10* (Mt. Lookout; Bri); *C. F. Plant* (Charters Towers; Bri); *Roe 26* (Darling Downs; Bri); *Simmons 9* (Fairy Bower; A); *Tambling* (Eulo; Bri); *Thozet* (Rockhampton; G); *Trist 37, Weatherhead* (near Benarkin; Bri); *C. T. White* (Darling Downs; Moreton; Bri), *9567* (Roma; A).

New South Wales.—*Boorman* (Marrabri; Emerald; Lake Eliza; L, UC, US); *Cleland* (Moree; Bri); *Cunningham 114* (Oxley; BM, K); *Gandoger* (Mo); *Goodwin* (Darling Rv.; K); *Kenny* (Childers; Bri); *McDougall* (Bourke; G); *C. T. White* (Rosewood; Bri), *12702* (McIntyre Brook; Bri).

VERNACULAR NAMES.—*Bitter Bark, Quinine Tree.*

A. constricta is described as having little or no latex in its bark, latex present in young shoots. Leaves somewhat pendulous. Flowers cream-yellow or white and sweetly scented. The plant is strongly trimmed by stock, and forms root-suckers.

Type of *A. mollis*.—"Queensland. Barcoo river, near Mount Northampton, *Mitchell.*"

Type of *A. constricta* var. *montmariensis*.—"Mount Maria, Warrego, *F.M.B.*, 1876; Eidsvold, *T. L. Bancroft*, 1911."

Pubescence and leaf width are entirely erratic characters in this species, having neither consistency in themselves nor concomitance with any other taxonomic feature or geographical distribution, and therefore cannot serve for even varietal segregation. Narrow leaves such as were used to characterize the var. *montmariensis* (6 mm. broad) and much broader ones (2.5 cm.) are sometimes found on the same branch. Plants with softly villose leaves of the *mollis* type are often growing intermingled with the glabrous form.

In his publication of var. *mollis*, Bailey made no mention of Bentham's binomial *A. mollis*. He did not cite the type for his variety, and it is not clear whether a new variety or a reduction of Bentham's species was intended.

Bentham (1869: 314) notes concerning *A. constricta*: "This species differs from the rest of the genus, and approaches *Tabernaemontana* in habit and foliage, and usually in the presence of small glands at the base of the calyx inside." The species is markedly distinctive, but no vestige of intra-calycine glands has been detected by me.

26. **Alstonia lanceolata** van Heurck & Muell. Arg., in van Heurck, Obs. Bot. 199. 1871.

Petioles 0.5–1 cm. long; leaf blades chartaceous, lanceolate or elliptic, 10–13 cm. long and 1.5–3 cm. broad, narrowed and somewhat acuminate at apex, glabrous, the lateral nerves numerous, about 40 pairs, 2–4 mm. apart. Inflorescence very sparsely and loosely flowered, the peduncles very short, about 1 cm. long, sparsely branched, pedicels up to 6 mm. long; corolla tube about 5 mm. long; corolla lobes somewhat shorter than corolla tube, about 4 mm. long, well-pilose the entire face within, manifestly ciliate. Follicles 25 cm. long; seeds about 16 mm. long, slender-caudate at both ends, tails up to 5 mm. long.

TYPE.—"Nova Caledonia ad Wagap: *Vieillard 921* (in herb. van Heurck)."

New Caledonia.—*Compton 1271* (Mt. Kanala; fr.; BM), *1719* (Ignambi; fl.; BM); *Schlechter 15565* (Oubatche; fl.; G, K, L); *Vieillard 921* (type coll.; fl.; G, GH, K).

27. **Alstonia Vieillardi** van Heurck & Muell. Arg., in Flora 53: 171. 1870.
A. Duerkheimiana Schlechter, in Tropenpf. 7: 528. fig., p. 529. 1903.

Branches stout. Petioles 1.5–5 cm. long; leaf blades large, 9–36 cm. long, 4–22 cm. broad, usually acuminate at apex, softly pubescent beneath, sometimes glabrous, dull above, the lateral nerves 16–22 pairs, 7–18 mm. apart. Inflorescence usually pubescent, the ultimate branchlets and pedicels adpressed or ascending, many-bracteate; flowers sulfur-yellow; corolla tube 8.5–9.2 mm. long, minutely puberulent outside near middle; corolla lobes carnose,

shorter than corolla tube, 3.5–8 mm. long, puberulent and short-pilose toward base inside; stamens inserted at about 1/3 from base of corolla tube. Follicles 21–30 cm. long; seeds 7–9 mm. long, the tails short, less than 2 mm. long.

TYPE.—"Habitat secus Toondu in Sinu Tupiti Nova Caledoniae: *Vieillard 924* (in herb. van Heurck)."

ILLUSTRATIONS.—Tropenf. (1903) 7: 529 (type of *A. Duerkheimiana;* br., infl., fr., lvs., fl. analysis).

DISTRIBUTION.—New Caledonia—*Compton 817* (Dumbea; BM), *2010* (Comboui; BM); *Deplanche 67* (L); *Franc* (Prony; A), *44* (Prony), *2450* (A); *Pancher* (K); *Schlechter 14867* (Paita; GH); *Vieillard 924* (type coll.; fl., G, GH, L); *C. T. White 2054* (Mt. Mou; A).

The type of *A. Duerkheimiana* was not cited. Material determined as this species by Schlechter is available. The synonymy of *A. Duerkheimiana* with *A. Vieillardi* was discussed by A. Guillaumin (1911*b*: 230).

28. **Alstonia Roeperi** van Heurck & Muell. Arg., in Van Heurck, Obs. Bot. 201. 1871.

Branchlets stout (7–10 mm. diam.), leaf scars large; leaves closely resembling those of *A. Vieillardi* but markedly shining above; petioles 3–4 cm. long, fossate at axil; leaf blades 14–28 cm. long, 3–15 cm. broad, usually acuminate at apex, sometimes obtuse to rounded, pubescent beneath, sometimes glabrous, the lateral nerves 16–25 pairs, 1–2 cm. apart. Inflorescence with spreading branches, profusely flowered; corolla tube 3.7–4.1 mm. long; corolla lobes oblong-lanceolate, 4.4–5.7 mm. long, pubescence within sometimes extending from base to near apex. Follicles up to 22 cm. long; seeds 15–16 mm. long, the tails very long and slender, up to 8 mm. long.

TYPE.—"Nova Caledonia ad Wagap: *Vieillard 922* (in herb. van Heurck)."

New Caledonia.—*Caldwell* (Doumbea; K); *Compton 671* (Mt. Dore; BM), *1518* (Ignambi; BM); *Deplanche 66* (K); *Franc 21* (Dumbea), *42* (UC); *Pancher* (K); *Schlechter 15445* (Oubatche; G); *Vieillard 922* (type coll.; G); *C. T. White 2038* (Mt. Mou; A), *2162* (Dumbea; A).

Collections of this species have been almost universally determined as *A. plumosa.* The identity of *A. Roeperi* with the latter is possible (see discussion under *A. plumosa*).

29. **Alstonia plumosa** La Bill., Sert. Austr. Caled. 28. t. 32. 1824.

Branchlets rather stout; petioles 6–12 mm. long; leaf blades elliptic, 2.5–11 cm. long, 1.2–3.5 cm. broad, rounded to obtuse or somewhat acute at apex, the lateral nerves about 15 pairs, arcuate and distantly spaced. Inflorescence crowded; corolla tube short; corolla lobes longer than corolla tube, oblong, pubescent within; stamens inserted below middle of corolla tube. Follicles 7–13 cm. long; seeds 24 mm. long, the tails long and slender, up to 9 mm. long. (Compiled from original description and photo of type.)

TYPE.—*La Billardière,* New Caledonia.

ILLUSTRATIONS.—Type (leafy br. with infl. and fr.; fl. analysis; seeds).

Specimen examined.—Type (photo).

The type is now deposited in the Instituto Botanico dell' Universita, R. Erabario Coloniale, Firenze, Italy. Known to me only from the original description and from a photograph of the type, I have failed to allocate the species. Of the New Caledonia *Alstonia* examined, *A. plumosa* is closest to *A. Roeperi,* of which I have seen the isotype and rather ample collections. In maintaining this view regarding affinity, great reliance is placed on seed character. The latter species, in fact, has been almost universally distributed as La Billardiere's plant. The name *A. plumosa* has also been widely applied to various species from Fiji and Samoa. The superficial appearance of the plant as seen in the plate might suggest a small-leaved glabrous form of *A. vitiensis, A. Reineckiana* or *A. montana.* (The seeds of the latter are

obviously different from those illustrated for *A. plumosa.*) However, up to the present time, I have found all the New Caledonian species of *Alstonia* to be endemic, and there is no evidence that La Billardiere's itinerary (*Voyage à la Recherche de la Pérouse*) included the Fijian islands. It stands to reason that the possibility is not precluded that *A. vitiensis* or *A. Reineckeana* may be found in New Caledonia, although there is no such evidence now at hand. Not counting *A. plumosa,* nine species are definitely known from New Caledonia; five of these are represented by only one or two collections. It is quite possible that *A. plumosa* is a rare species which has not yet been rediscovered. It is also barely possible that *A. plumosa* is a very unusual form of *A. Roeperi*—a form with small blunt glabrous leaves—for leaf character is hardly reliable in this group. Completely glabrous, blunt-leaved forms do occur in *A. Roeperi,* for example, in *Compton 1518* cited above. In a closely knit group such as *plumosa–costata* in which floral characters are almost identical and diagnostic differences of any kind are very difficult to discern even with aid of botanical specimens, it is hopeless to attempt to form a clear idea of *A. plumosa* without at least an examination of the type.

30. **Alstonia vitiensis** Seem., Fl. Vit. 430. 1873.

A. villosa Seem., Fl. Vit. 161. 1866 (homonym); non Blume, Bkjdr. 16: 1038. 1826.

Typical branchlets very stout, up to 1.5 cm. in diameter, fistulose, leaf scars large; petioles 2.5–9 cm. long, conspicuously fossate at axil; leaf blades often immense, 8–45 cm. long, 4–27 cm. broad, rounded, or shortly blunt-acuminate at apex, mostly obtuse at base, softly villose (pubescent series) to glabrous beneath (glabrous series), generally less shining above than in *A. Roeperi,* the lateral nerves 12–16 pairs, 1.5–3 cm. apart. Inflorescence many-flowered, ample, and rather spreading; calyx 1–2 mm. in diameter; corolla tube (2.2–) 3.9–4.4 mm. long; corolla lobes linear-lanceolate, longer than corolla tube, 4–8 mm. long, pilose within only at base to entire face. Seeds 13–18 mm. long, the tails long and slender, up to 7 mm. long.

TYPE.—"Viti Levu (*Seemann 318*). Possibly Deplanche's n. *66,* from New Caledonia, may be identical with this species, which I collected in fruit only, and distributed under the erroneous name of *A. plumosa,* Labill." *Deplanche 66* is *A. Roeperi.*

ILLUSTRATIONS.—Bul. Bernice P. Bishop Mus., Honolulu, 74:65. 1935. (leafy br., fr., seed); Jour. N. Y. Bot. Gd. (1945) 46: 112 (glabrous-leaved series; leafy br. and infl., fl., fr.).

DISTRIBUTION.—Common in Fiji; a dubious form in the Solomon Islands. Reported from rain and open forests, and from coastal thickets; altitude 30–600 m.

Pubescent-leaved series.—Fiji: *Horne 515* (GH); *Storck.* Taviuni: *Gillespie 4790* (GH, UC). Viti Levu: *Degener 15266*; *Gillespie 2467, 3040* (UC), *3623, 3653, 4228* (UC), *4273* (Bish); *Greenwood 361A*; *Meebold 16787* (Bish); *Parks 20900* (UC); *Petersen 3*; *Seemann 318* (type coll.; fl., fr.; GH, K); *Setchell and Parks 15052* (UC).

Glabrous-leaved series.—Fiji: Viti Levu: *Degener 15040, 15062, 15124, 15153*; *Gillespie 2912* (det.? US); *Meebold 16716* (det.? *Bish*); *St. John 18301* (Bish). Vanua Levu: *Degener and Ordonez 14022*; *A. C. Smith 1701.* Kandavu: *A. C. Smith 251.* Solomon Islands: Ysabel Island: Tiratona: *L. J. Brass 3404* (rain forest, alt. 600 m.; fl.; L).

VERNACULAR NAMES.—*Mbule, Ndranga, Soroua.*

The glabrous-leaved series of specimens has a hardly appreciable tendency toward a broader calyx and a shorter (2.2–3.8 mm. long) corolla tube. The leaves are frequently smaller and easily confused with those of *A. Reineckeana* and *A. montana.*

30a. **Alstonia vitiensis** var. **novo-ebudica** Monachino, var. nov.

A forma typica speciei foliis lanceolatis ad basin apicemque plusculum acuminatis, tubo

corollae 2.2–3 mm. longo, et seminibus 22 mm. longis, caudis usque ad 10 mm. longis recedit.

Petioles 2 cm. long; leaf blades lanceolate, 6–16 cm. long, 4–7 cm. broad, bluntly short-acuminate to greatly narrowed and sharp-pointed at apex, tapering at base, glabrous or faintly barbate on midrib beneath, the lateral nerves about 11 or 10 pairs, 1–2 cm. apart. Inflorescence profusely flowered; corolla tube 2.2–3 mm. long; corolla lobes about 6 mm. long; style about 0.8 mm. long. Seeds 22 mm. long, tails up to 10 mm. long.

TYPE.—*S. F. Kajewski 292,* Eromanga Island, Dillon Bay, altitude 300 m., rain forest and red soil bracken country; May 23, 1928. Small tree 8 m. tall; fl. white; fr. 25 cm. long. "Nev-yev-vi-are." (New York Bot. Gd.)

DISTRIBUTION.—New Hebrides, sometimes common; reported from rain forest, poor volcanic soil, red soil, and bracken country; altitude 50–300 m.

New Hebrides.—Eromanga: *Aubert de La Rüe* (2nd voyage, 1935–6; fl.; A); *Kajewski 292* (type coll.; fl. and fr.; A, K, NY). Aneityum Island: Anelgauhat Bay: *Kajewski 740* (fl.; A, K, NY, US). Santa Cruz: Vanikoro: *Kajewski 652* (fl. and fr.; A, Mo).

This is a weak and transitional variety. In general appearance it is markedly like the Solomon Island race of *A. vitiensis,* which, in turn, is similar to the glabrous-leaved series from Fiji.

Kajewski 292 and *740* are cited as "*Alstonia villosa* Seem. form. *calvescens* Markgraf" in Jour. Arn. Arb. 13: 19. 1932. The forma proposed by Markgraf is of *A. villosa* Blume, *non* Seem.

31. **Alstonia Reineckeana** Lauterb., in Engl. Jahrb. 41: 233. 1908.
?A. Setchelliana Christoph., in Bul. Bernice P. Bishop Mus., Honolulu, 128: 178, fig. 27. 1935.

Branchlets not stout; petioles 1.5–3 cm. long; leaf blades 7–20(–25) cm. long, 3–9(–12) cm. broad, short-acuminate or acute to rounded at apex, glabrous or rarely villose beneath, the lateral nerves mostly 10–13(–17) pairs, about 1 cm. apart. Inflorescence few- to many-flowered; calyx mostly 1.4–2.5 mm. in diameter below lobes; corolla tube 5–6 mm. long; corolla lobes narrowly lanceolate, 9–14 mm. long, pilose toward the base within. Seeds 12–18 mm. long, the tails long and slender, 4–8 mm. long.

TYPE.—"*Vaupel 353.* Savaii: am Maugamu." Samoa.

ILLUSTRATIONS.—Carnegie Inst. Washington, Publ. No. 341 (1924) t. 12, A (photo of leafy br., infl., leafy br., fr.). Type of *A. Setchelliana* (leafy br., infl., fr., seed).

DISTRIBUTION.—Frequent in Fiji and Samoa; reported from sea level to 1300 m. altitude; rain forest, scrub, or dense forest.

Fiji.—*Horne 281* (GH). Viti Levu: *Gillespie 2285* (det.? UC), *3506* (det.? US); *Greenwood 1019* (det.?). Vanua Levu: *A. C. Smith 1603, 1683, 1795.* Koro: *A. C. Smith 1026.* Moala: *Bryan Jr. 343* (A). Taviuni: *Gillespie 4836.*

Samoa.—*Powell 350* (K); *Vaupel 382*; *Wilkes.* Savaii: *Christophersen 646, 3071* (US), *3540*; *Christophersen and Hume 1903*; *Vaupel 353* (type coll.; fl.; K, NY, US). Tutuila: *Christophersen 1139* (cf. *A. Setchelliana*), *1257* (cf. *A. Setchelliana*; US), *1265* (type coll. *A. Setchelliana*; Bish); *Collarino 381* and *387* (UC); *Wilkes* (US).

VERNACULAR NAMES.—*Ma'u'u Toga vao, Ndranga nggurunggura, O le fuai La'au Timei, Wa boli.*

Type of *A. Setchelliana.*—"Tutuila: forest, Alava Ridge, alt. 400 m. Nov. 7, 1929, *Christophersen 1139*; forest, ridge west of Pago Pago, alt. 300 m., Nov. 14, 1929, *Christophersen 1257*; forest ridge west of Pago Pago alt. 300 m., young fl., fr., Nov. 14, 1929, *Christophersen 1265,* type in B. P. Bishop Museum."

A. Reineckeana is a transitional species between *A. vitiensis* and *A. montana,* somewhat nearer to the former, which *A. Setchelliana* also more closely approaches. *A. Setchelliana* is possibly a distinct entity. *A. Reineckeana* may eventually prove to be a synonym of *A. Godeffroyi* (see under Doubtful Species).

32. **Alstonia montana** Turrill, in Jour. Linn. Soc., London, Bot., 43: 32. 1915.

A. Smithii Markgraf, in Bul. Bernice P. Bishop Mus., Honolulu, 141: 125, fig. 65a. 1936.

Branchlets generally slender; petioles 1–3.5 cm. long; leaf blades 5–15 cm. long, 2.5–6 cm. broad, mostly obtuse or rounded at apex, sometimes bluntly short-acuminate, glabrous, the lateral nerves 11–22 pairs, 4–7 mm. apart. Inflorescence usually few-flowered; calyx 1.4–2.6 mm. diam. below lobes; corolla tube 3–6 mm. long; corolla lobes oblong-lanceolate, 3–7 mm. long, pilose toward base within; anthers 0.9–1.6 mm. long. Seeds 7–10 mm. long, the tails short, 2–4 mm. long, often obscurely lobed, their forks close to body of seed.

TYPE.—"Nandarivatu, by 'Governor's Seat' in flower and fruit, Jan. 31, 1906, *im Thurn,* 58." Fiji, Viti Levu.

ILLUSTRATION.—Type of *A. Smithii* (leafy br. and infl., leaf).

DISTRIBUTION.—Throughout Fiji and apparently also in Samoa; reported from rain forest, dense brush or thickets, open forest; altitude 500–1,200 m.

Fiji.—*Wilkes.* Viti Levu: *Degener 13596, 14396* (A), *14424, 14673* (A), *14800; Degener and Ordonez 13589*; *Gillespie 3286, 3375* (Bish), *3586, 3801* (UC), *3899, 3901* (Bish, UC), *4131* (UC); *Greenwood 361* (Bri), *362* (Bri, K); *E. im Thurn 58* (type coll.; BM, K); *Parks 20505* (UC); *Tothill 388* (K). Vanua Levu: *A. C. Smith 697* (type coll. *A. Smithii*; fl.; GH, NY, UC, US), *711, 1722, 1758.* Ovalau: *Gillespie 4428* (UC).

Samoa.—Tutuila: *Christophersen 1061.*

VERNACULAR NAMES. — *Ndrengandrenga, Rerese, Soroua.*

Type of *A. Smithii.*—"Vanua Levu: Thakaundrove, summit of Mount Mbatini, in dense thickets, alt. 1,030 m., Nov. 29, 1933, *Smith 697* (Type), *711.*" A. C. Smith (in herb.) queries whether *A. Smithii* is distinct from *A. montana.* The form of authority-citation accepted here for the former is debatable in different interpretations of Art. 48 of the International Rules. In my understanding, however, the responsibility for the publication of *A. Smithii* rests almost entirely on Markgraf who named and described the plant and who treated the Apocynaceae in Smith's article entitled *Fijian Plant Studies.*

32a. **Alstonia montana** var. **filiformis** Monachino, var. nov.

A forma typica speciei floribus minoribus, calicibus 1–1.3 mm. latis, et ramulis inflorescentiae filiformibus recedit.

Leaf blades becoming more coriaceous than in the typical form, the lateral nerves more numerous and closer, mostly 16–22 pairs, 4–6 mm. apart. Inflorescence with filiform spreading branches and pedicels; calyx 1–1.3 mm. in diameter below lobes; corolla tube 2.5–4 mm. long; corolla lobes 2–5 mm. long, pilose at base or sparsely so on the entire face within.

TYPE.—*J. Horne 1043,* Fiji Islands, June 1878. "Small tree 15–20 feet in height. Flowers yellow, small. Common in the woods at Nabesi, Suva, Viti Levu." (Kew.)

DISTRIBUTION.—Throughout Fiji. Reported from margins of woods or woods, mountains up to 300 m. altitude; said to be "common on the poorest as well as on the richest soils, in sheltered as well as in exposed places."

Fiji.—*Horne 587* (fl.; GH), *607* (fl. and fr.; K); *Storck 3* (fl. and fr.; GH, K, NY), *20* (fl. and fr.; GH, K). Viti Levu: *Horne 861* (fl. and fr.; GH, K), *1043* (type coll.; fl.; GH, K), *1057* (fr.; GH); *MacDaniels 1150* (Suva; A, det.?; fl. larger, approaching typical form); *Tothill 396* and *427* and *F475* (Bish; det.?). Vanua Levu: *Milne 213* and *215* and *261* (K), *A. C. Smith 1540* (det.?). Naviti Levu: *Milne 101* (fr.; K). Ovalu: *Gillespie 4549* (fl.; Bish, UC).

This variety approaches very closely *A. Lenormandi* of New Caledonia.

J. Horne (1881) refers to *861* as a new species. He presents an interesting discussion on forms of *Alstonia* found in Fiji. There is a large-leaved form growing in rich soil at the bottom of valleys and ravines; this attains a

height of 30 feet and a trunk 1 foot in diameter. A small-leaved form grows on tops of ridges; this seldom attains 15 feet in height and a trunk ½ foot in diameter. There is also a form occupying a middle position in regard to character and habitat; this grows on the sides of ravines. Horne suggests that characters vary according to habitat.

33. **Alstonia costata** (Forst. f.) R. Br., in Mem. Wern. Soc. 1: 77. 1811. Non ex Wall. Num. List 1649. 1829; nec Wall. ex Miquel, Fl. Ind. Bat. 2: 439. 1856. =*A. macrophylla.*

Echites costata Forst. f., Prod. 20. 1786; non cit. *"Kametti-valli"* Rheede.

Alstonia fragrans J. W. Moore, in Bernice P. Bishop Mus., Bul., Honolulu, 102: 39. 1933.

?A. elliptica J. W. Moore, in Bernice P. Bishop Mus., Bul., Honolulu, 102: 39. 1933.

Petioles 2.5 cm. long; leaf blades very variable in shape and size, broadly elliptic to narrowly lanceolate, 9–21 cm. long, 1.5–10 cm. broad, usually sharply and abruptly long-acuminate at apex, glabrous, shining above, the lateral nerves 10–17 pairs, 8–20 mm. apart. Inflorescence mostly many-flowered; calyx 1.2–2 mm. diam. below lobes; calyx lobes ovate-lanceolate, 2–2.9 mm. long; corolla tube 3.4–4.1 mm. long; corolla lobes linear-lanceolate, 7–10 mm. long, usually pilose at base within only. Follicles 6–20 cm. long; seeds 4.5–7 mm. long, the tails short, 1–3 mm. long, their forks close to body of seed.

TYPE.—*"Echites costata* Forst. Prod., n. 123. Hab. in insulis Otaheité et Ulaietea, inter juga montium (insularibus Attané nuncupata). Josephus Banks Baronettus. (v.s. in Herb. Banks)."

Type of *Echites costata.*—Number 123 of Forst. Prod., p. 20. "Insulae Societatis." Forster's citation of *Kametti-valli* Rheede. (Hort. Malab. 9: 23, t. 14) for his plant is erroneous, as pointed out by Robert Brown. Van Draakenstein refers *Kametti-valli* to *Aganosma.* An amplified description of Forster's plant under *Alstonia costata* appears in Guillemin (1837: 246), in which credit is given to "Forst. *mss.*"

ILLUSTRATIONS.—Drake, Ill. Fl. Ins. Pacif. (1886) t. 10 (leafy br., infl., fr., fl. analysis, seed).

DISTRIBUTION.—The easternmost range of the genus; in the Pacific, from Cook Islands to the Marquesas. Reported from mountainside and forest in cloud zone; on decomposed lava and heavy clay loam; altitude 200–2,000 m.

Cook Islands.—Rarotonga: *Wilder 544* (Bish), *729* (Bish, NY).

Society Islands.—Tahiti: *Forster* (type coll.?; fl.; K); *Lépine 199* (G); *MacDaniels 1542* and *1666* (Bish); *McComish* (Bri); *Moerenhout* (G); *Nadeaud 371* (G); *Quayle 57* and *247* (Bish); *Whitney Exped. 588* (Bish); *Wilkes* (GH); *Setchell and Parks 485* (GH), *525* (UC). Raiatea: *Moore 84* (type *A. fragrans*; fl. and fr.; Min), *395* (Bish), *746* (type *A. elliptica*; fl. and fr.; Min; det.?). Eimeo (Moorea): *Wilkes* (US).

Marquesas.—Hiva Oa: *Adamson and Mumford 140* (Bish), *498*; *F.B.H. Brown 879* (Bish); *Quayle 1338* (Bish). Uahuka: *Quayle 1753* and *1836* (Bish).

VERNACULAR NAMES.—Tahiti: *Afairetou, Atae, Latai, Napau, Utureva.*

Type of *A. fragrans.*—*J. W. Moore* "Field number *84,* Sept. 16, 1926, alt. 350 m.; south facing slope of mountain, east path to Mount Temehani."

Type of *A. elliptica.*—*J. W. Moore* "Field number *746,* Apr. 16, 1927, alt. 600 m.; in red clay soil, Red Temehani."

A. fragrans is placed satisfactorily under synonymy of *A. costata.* The leaf character of *A. elliptica* aproaches that of *A. montana,* but the species probably is merely an atypical form of *A. costata. Brown 879,* from the Marquesas, has been designated by Grant (in herb.) as type of a new species; this plant, together with the other Marquesan representatives, is not completely congruous with typical *A. costata,* as already noted by F. B. H. Brown. The flowers

are stouter, calyx broader, corolla lobes broader and relatively shorter; the seeds (up to 10 mm. long) and tails (up to 3 mm. long) are longer. The difference, however, is not substantial enough to permit any segregation without further validation. F. B. H. Brown (1935: 233) stated that he observed *A. costata* in the Marquesas only at high altitudes in the rain forest and that it was never more than 2 m. in height.

34. **Alstonia Deplanchei** van Heurck & Muell. Arg., in Flora 53: 171. 1870.—excl. cit. *462.*

Alstonia retusa S. Moore, in Jour. Linn. Soc., Bot., 45: 363. 1921.

Petioles 0.5–1 cm. long; leaf blades oblanceolate, 3–4.5 cm. long, 1–2 cm. broad, retuse at apex, glabrous, the lateral nerves ascending, about 14 pairs, 2–3 mm. apart. Inflorescence short, sparsely flowered, the branches rather erect; corolla tube about 6 mm. long; corolla lobes oblong, about 2.5 mm. long, very faintly pubescent outside with short adpressed hairs, pilose toward base within; stamens inserted at about one-third from base of corolla tube. Follicles about 5 cm. long; seeds 7 mm. long, the tails very short, their forks close to body of seed.

TYPE.—*Deplanche 462 bis,* New Caledonia, Pum.

New Caledonia.—*Compton 2363* (type *A. retusa*; photo); *Deplanche 462 bis* (type coll.; fl. and fr.; BM, G, L, NY).

Under *A. Deplanchei, "Deplanche 462, 462 bis"* were originally cited. The former specimen belongs with *A. Lenormandi,* but the description is obviously of the latter: "folia numerosa . . . cuneato-obovatis . . . emarginato-retusis . . . cymis parvis contractis subpaucifloris . . . tubus corollae 5 mm. longis . . . lobis tubo 2½-plo brevioribus . . . corollae tubo fere ad trientem altidinis paulo latere et staminigero . . ." In van Heurck (1871: 180) *A. Deplanchei* is clearly distinguished from *A. Lenormandi.* As the two elements represented by *Deplanche 462* and *462 bis* are not entirely discordant, and particularly since the original description of *A. Deplanchei* unmistakably typifies the species, I do not reject the name as a *nomen confusum.*

Type of *A. retusa.*—"Poume: serpentine scrub; 500 ft., *2363" R. H. Compton,* New Caledonia. Only photo of type seen, but it appears identical with type of *A. Deplanchei.*

35. **Alstonia Lenormandi** van Heurck & Muell. Arg., in Flora 53: 172. 1870.

A. filipes Schltr. ex Guillaumin, in Ann. Mus. Col. Marseille, Ser. 2, 9: 195. 1911.—nom. nud.

Branchlets slender; petioles 1–2(–6) cm. long; leaf blades 5–8(–18) cm. long, 2.5–5(–11) cm. broad, rounded or slightly retuse at apex, glabrous, the lateral nerves horizontally spreading, 22–25(–30) pairs, about 5 mm. apart. Inflorescence with slender peduncles, branches filiform and spreading, pedicels slender; calyx minute, 0.7–1.4 mm. diam. below lobes; calyx lobes 0.6–1 mm. long; corolla tube 2.3–3 mm. long; corolla lobes narrowly lanceolate to oblong-lanceolate, 2.8–5 mm. long, pubescent toward base within; anthers 0.7–0.8 mm. long; style short, 0.25–0.5 mm. long. Follicles 6–9 cm. long; seeds 6–12 mm. long, the tails short, their forks close to body of seed.

TYPE.—"Nova Caledonia ad Kanala, baie d'Urville, ubi legit oculatissimus *Vieillard 919,* et unde communicavit amicissimus Lenormand. (in herb. van Heurck)."

DISTRIBUTION.—New Caledonia; reported as frequent in serpentine scrub, altitude 150 m.

New Caledonia: *Compton 883* (Baie Kuakué; BM; approaches var. *coriacea*); *Deplanche 462* (Port-Boisé; fl. and fr.; G, K, L), *919* (type coll.; fl. and fr.; G, GH, L, NY); *Franc 235* (serie A; Prony; type coll. *A. filipes*; fl.; A, G, GH, K, L, NY, UC, US), *2214* (fl. atypical, corolla lobes short and broad; UC); *Gandoger* (Prony; Mo); *Vieillard 2947* (Gatope; K).

Type of *A. filipes.*—Guillaumin cited *Franc 235.* Several different collections annotated as *A. filipes* by Schlechter are available.

Franc 2214 has leaves up to 16 cm. long and 8.5 cm. broad, but has also on the same branch much smaller leaves (7 cm. long and 3 cm. broad).

There is no precise demarcation between this species and the following two varieties.

35a. **Alstonia Lenormandi** var. **coriacea** (Panch. ex S. Moore) Monachino, stat. nov.

Alstonia coriacea Panch. ex Guillaumin, in Ann. Mus. Col. Marseille, Ser. 2, 9: 195. 1911.—nom. nud.

Alstonia coriacea Panch. ex S. Moore, in Jour. Linn. Soc., Bot., 45: 362. 1921.

Leaf blades coriaceous, lanceolate to elliptic, 7–14 cm. long, 1.5–4 cm. broad, obtuse to faintly acuminate at apex, reticulation of veins not showing.

TYPE.—"Vieillard 2956," New Caledonia. Guillaumin, in Ann. Mus. Col. Marseille, cites "Nouvelle-Caledonie (*Vieillard 2943, 2956*), Boulari (*Pancher 271*)."

DISTRIBUTION.—New Caledonia; reported as common in scrubby woods, altitude 660 m.

New Caledonia.—*Compton 314* (Plaine des lacs; BM), *693* (Mt. Dore; BM); *Franc* (fr.; UC), *1690, 1809* (Prony; G), *1999* (Dumbea; approaches *A. Legouixiae*; G), *2473* (A); *Vieillard 914* (Unia; K), *2946* (Gatope; K).

The binomial *Alstonia coriacea* was proposed in manuscript but not published by Pancher, and was subsequently validly published and ascribed to him by S. Moore who supplied the description. In Moore's article (1921: 362) the citation of authority appears as "Panch. MS. ex Guillaum."

35b. **Alstonia Lenormandi** var. **lanceolifera** (S. Moore) Monachino, stat. nov.

Alstonia lanceolifera S. Moore, in Jour. Linn. Soc., Bot., 45: 362. 1921.

Corolla lobes broadly ovate, 2.2–2.4 mm. long, 2.2–2.8 mm. broad, obtuse at apex. Leaves in *Franc 224* are similar to those of *A. Lenormandi* var. *coriacea*; in type (ex descrip. and photo): mostly opposite, rarely ternately verticillate; petioles about 5–10 mm. long; leaf blades, pergameneous, oblong-lanceolate, 8.5–10.5 cm. long, 1.7–2.5 cm. broad, the lateral nerves 20–24 pairs.

TYPE.—"Mt. Koghi; margin of valley forest; 1000 ft.; serpentine. *766" R. H. Compton,* New Caledonia.

New Caledonia.—*Compton 766* (type; photo); *Franc 224* (Dumbea; A, G, L, NY, UC, US).

Moore notes, "This has much the foliage of *A. lanceolata* v. Heurck & Müll. Arg., but different flowers."

36. **Alstonia Legouixiae** van Heurck & Muell. Arg., in Flora 53: 171. 1870.

Leaves very similar to those of *A. Lenormandi* var. *coriacea* but generally ternately verticillate as well as opposite; petioles somewhat shorter, 0.5–1 cm. long; leaf blade 5–7 cm. long, 1–2 cm. broad, the lateral nerves obscure. Inflorescence with ascending branches stouter than those of *A. Lenormandi,* flowers numerous and in rather crowded cymes; calyx 1–1.6 mm. diam. below lobes; calyx lobes 0.9–1.3 mm. long; anthers 0.8–1.2 mm. long; corolla and seeds like those of *A. Lenormandi*; follicles 3–10 cm. long.

TYPE.—"ad laterd arida montium in Sinu Tupiti insulae Novae Caledoniae: *Vieillard 920* (in herb. van Heurck)."

DISTRIBUTION.—New Caledonia; reported as frequent, altitude 100–1,000 m.

New Caledonia.—*Compton 738* (Mt. Koghi; BM), *1324* (Bogota; BM), *2030* (Nekando; BM); *Franc 63* (Prony; G), *522 bis* (Mt. Dzumae; L), *2317* (Mt. Koghi; A); *Pancher 272* (K); *Schlechter 15182* (Ngoyé; G, L, K); *Vieillard 2942* (Kanala; BM, F).

"Alyxia Legouixiae" in Guillaumin (1911*a*: 196) is a typographical error for *Alstonia Legouixiae.*

37. **Alstonia saligna** S. Moore, in Jour. Linn. Soc., Bot., 45: 364. 1921.

Shrub or small tree, the branchlets slender; petioles short, 0.5–1 cm. long; leaf blades thinly

coriaceous, linear-lanceolate, 5–9 cm. long, about 0.5–0.8 cm. broad, blunt at apex, glabrous, the lateral nerves about 30 pairs. Inflorescence lax, branches divaricate, pedicels about 6 mm. long; calyx 1.25 mm. long; corolla tube 2.25 mm. long; corolla lobes oblong, 4 mm. long; anthers 0.3 mm. long. (Compiled from original description and photograph.)

TYPE.—"Riv. Ngoyé; *Spermolepsis-Casuarina* forest; 500 ft.; serpentine. *1009." R. H. Compton,* New Caledonia. (British Museum.)

SPECIMEN EXAMINED.—Type (photo).

The available data on *A. saligna* are not sufficient to place the species precisely. Affinity with *A. Lenormandi* is suggested. Moore notes, "In the flowers this much resembles *A. Comptonii,* but its smaller narrow willow-like leaves are very distinct."

38. **Alstonia Comptonii** S. Moore, in Jour. Linn. Soc., Bot., 45: 363. 1921.

Small tree up to 7 m. high; branches stout; leaves opposite; petioles 1.5–5 cm. long; leaf blades thinly coriaceous, oblong-oblanceolate, large, 12–25 cm. long, 3–6 cm. broad, rounded to shortly blunt-acuminate at apex, glabrous, the lateral nerves numerous, 35–50 pairs. Inflorescence ample, lax, and diffuse, the branches greatly divaricate, the pedicels long and slender, about 4 mm. long; corolla tube 2.25 mm. long; corolla lobes 4 mm. long; anthers 0.75 mm. long. (Compiled from original description and photograph.)

TYPE.—"Kuakué; scrub-forest; 200 ft.; serpentine. *953." R. H. Compton,* New Caledonia. (British Museum.)

Moore notes, "The long narrow *Rauwolfia*-like leaves coupled with the very divaricate branches of the cymes affords an easy means of recognizing this plant."

SECTION DOUBTFUL

39. **Alstonia quaternata** van Heurck & Muell. Arg., in Flora 53: 170. 1870.

Branchlets stout (7–15 mm. diam.); leaves 4-verticillate; petioles 2–4.5 cm. long; leaf blades elliptic, 8–16 cm. long, 2.5–4 cm. broad, rounded or obtuse at apex, gradually and strongly attenuate at base, glabrous, strikingly nitidous above, the margins involute, the lateral nerves horizontally spreading, rather straight, 35–60 pairs, 1.5–3 mm. apart, the reticulation not manifest. Inflorescence closely crowded, the ultimate branches adpressed or ascending, profusely bracteate (bracts deciduous), the pedicels very short; calyx lobes carnose, ovate, about 1.3 mm. long and 1.6 mm. broad, obtuse at apex, entirely glabrous; corolla tube 5–5.4 mm. long, glabrous outside; corolla lobes very thick, cucullate, oblong, 2.8–4.1 mm. long, 1.7 mm. broad, glabrous without, pilose within the lower half and bearded at base; anthers 1.2–1.4 mm. long, the filaments inserted at about one-third from base of corolla tube; style very short or not apparent; ovary characteristically sulcate longitudinally with about 10 sharp ridges, glabrous, (either of two carpels very close together or syncarpous); ovules in two rows (sometimes reduced to one row?) in each cell, relatively few.

TYPE.—"Nova Caledonia ad Ponébo: *Deplanche 456* (in herb. van Heurck)."

New Caledonia.—*Deplanche 456* (type coll.; fl.; G, K); *Schlechter 15578* (mt. near Oubatche; fl.; G, GH, K, L).

This interesting species is outstandingly unique and cannot be placed satisfactorily in any section. It suggests § *Dissuraspermum,* affinity with *A. Legouixiae.* Discovery of the fruits should clarify its position.

DOUBTFUL SPECIES

A. angustifolia var. **latifolia:** see *A. angustifolia.*

A. elliptica: see *A. costata.*

Alstonia Godeffroyi Reinecke, in Engl. Jahrb. 25: 667. 1898. Type.—"Upolu: Letogo-Siuma-Kamm, 750 m. Apr. 1895 (*483*)" Reinecke, Samoa. Belongs to § *Dissuraspermum,* but without the type I am unable to sug-

gest its precise position. The salient features in its original description are as follows: petioles 2–3 cm. long; leaf blades narrowly long-lanceolate, 12–20 cm. long, 1.5–3 cm. broad, glabrous; cymes many flowered; corolla tube 1.5–2 mm. long; corolla lobes 3–4 mm. long; follicles 15–25 cm. long. Of the *Alstonia* specimens examined the only species I accredit to Samoa are *A. Reineckeana, A. Setchelliana,* and *A. montana.* The leaf shape of *A. Reineckeana* is variable and it is not impossible that examples can be found like that of *A. Godeffroyi.* Examples are available of narrowly lanceolate leaves in *A. costata*; this species, however, has not yet been collected west of the Cook Islands.

"**Alstonia intercedens**" in van Heurck, Obs. Bot. 176. 1871.—*nom. nud.* Appears in the discussion under *A. quaternata,* likely through error.

A. Kurzii: see *A. scholaris.*

A. longissima: see *A. spectabilis.*

A. paucinervia: see *A. macrophylla.*

Alstonia pedicellata Pierre ex A. Cheval., Veg. Ut. Afr. Trop. Franc. 9: 273. 1917.—pro synon. Chevalier cited this name, ex Pierre MS., in synonymy under *A. congensis.* However, Chevalier's concept of *A. congensis* is questionable as he distributed specimens of *A. Boonei* under this name (*Chevalier 2690* and *15194*).

A. Setchelliana: see *A. Reineckeana.*

Alstonia spectabilis var. **bantamensis** Blume, Bijdr. Fl. Ned. Ind. 16: 1037. 1826. Type.—"montanis Provinciae Bantam." I am uncertain about Blume's concept of *A. spectabilis.* His description of the leaves being in verticils of 4–6 suggests a form of *A. scholaris,* or possibly *A. angustiloba,* rather than *A. spectabilis.* The diagnosis given by Blume for his variety is: "foliis cuneato-oblongis obtusiusculis, umbella terminali simplici." It is unlikely that the variety refers to *A. spatulata,* as this species was known to Blume, who was its author.

Alstonia viscosa K. Schum. ex. Engl., in Sitz. Preuss. Akad. Wiss. 38: 829. 1908.—*nom. nud.* Listed without description or any other reference by A. Engler, *Pflanzengeographische Gliederung von Africa,* under the section dealing with the Congo basin and the area where Pogge collected in 1883. There are only two species of *Alstonia* known from Africa, namely *A. congensis* and *A. Boonei.*

A. villosa f. **calvescens**: see *A. spectabilis.*

EXCLUDED SPECIES

Alstonia ciliata Benth., Pl. Hartweg. 48. 1840. Type.—"In loco *Banco* dicto," *Hartweg 366,* Mexico. (!type coll.; sterile; G.) Corrected by Bentham in the same work (1841) to *Symplocos.* The species is placed by A. Brand (1901: 80) under *Symplocos coccinea* var. *Benthamii* (Gürke) Brand.

Alstonia costulata Miquel, Fl. Ind. Bat. Suppl. 556. 1860. Type.—"Sumatra occid. in prov. Priaman (*Diepenhorst*)." =*Dyera costulata* (Miquel) Hook. f.

Alstonia edulis G. Benn., in Jour. Bot. 5: 150. 1867. George Bennett received the fruits of this species from D. N. Joubert, who brought them from New Caledonia and also gave information regarding them. The species is said to be a climbing plant growing most luxuriantly in all the thick scrubs along the banks of freshwater streams; leaves heart-shaped, of a dark-green color; fruits in clusters, downy skinned, and exuding a milky juice. The natives in the vicinity of Port de France call it *Jecko,* and use it as food. Some of the fruits were cooked by Bennett, who found them "of an agreeable flavor." Bennett's reference to this plant is very casual, and no mention is made of it by subsequent authors, except Guillaumin (1911*a*: 195), who cites "*A. edulis* G. Benn.—Nouméa (*Vieillard*)." There are no vines in *Alstonia,* and no known species in the genus has cordate leaves. Obviously, *A. edulis* is not an *Alstonia.*

Alstonia eximia Miquel, Fl. Ind. Bat. Suppl. 555. 1860. Type.—"Bangka, prope Djebus (*Teysmann*)." (! L)=*Dyera costulata* (Miquel) Hook. f.

Alstonia ficifolia S. Moore, in Jour. Bot. 61 (Suppl.): 32. 1923. Specimen examined.—type coll., *Forbes 74*, Sogere, New Guinea (fl.; K). Markgraf (1927: 190) has correctly named the species *Ochrosia ficifolia* (S. Moore). Flowering and fruiting specimens of an *Ochrosia* deposited at the New York Botanical Garden, *C. E. Carr 12615* and *12616*, collected at Koitaki, Papua, belong either to this species or to an undescribed one bearing very close affinity to it (the calyces, 4 mm. broad, are broader than those seen in *Forbes 74*). Of the flowering material, only two buds in poor condition were available. The fruits, hitherto unknown for *O. ficifolia*, are ellipsoid, not angled, 8 cm. long, 4 cm. in diameter, their mesocarp is hard-woody and of a rather uniform texture except for deep pits near the surface. The tree is noted as about 60 feet tall and as bearing copious latex. As further indications of the sometimes similar appearance of *Ochrosia* and *Alstonia* are two sterile specimens collected in Netherlands New Guinea, Seroei, Japen (*Neth. Ind. For. Serv. 30273* and *30288*; A). These match the Koitaki plant and have been distributed as "*Alstonia* sp. nov."

Alstonia grandifolia Miquel, Fl. Ind. Bat. Suppl. 555. 1860. Type.—"Sumatra orient. in prov. Palembang (*Teysmann*)." (! K, L)= *Dyera costulata* (Miquel) Hook. f.

Alstonia longifolia (A. DC.) Pichon, in Paris Mus. d'Hist. Nat. Bul., II, 19: 297. 1947.= *Tonduzia longifolia* A. DC. See discussion in Supplement.

Alstonia lucida D. Don, Prod. Fl. Nepal. 131. 1825. *Blaberopus lucidus* A. DC., Prod. 8: 411. 1844. Type.—"Nepalia. Hamilton. Wallich. *Echites triangularis* Hamilton Mss." The reference to Wallich seems to be to No. *1675* (!), "*Ichnocarpus fragrans* Wall." of the Numerical List, which is *Trachelospermum lucidum* (D. Don) K. Schum. *A. lucida* is placed under *Trachelospermum* by Hooker, Woodson, Tsiang, and others.

Alstonia micrantha Ridley, Jour. As. Soc. Straits 79: 95. 1918. Type.—"Selangor; Rantau Panjang (*Kloss*)." (! K)=*Chilocarpus*, possibly *C. embelioides* King & Gamble (ex descrip.).

Alstonia polyphylla Miquel, Fl. Ind. Bat. Suppl. 556. 1860. Type.—"Bangka (*Teysmann*)."=? *Dyera Lowii* Hook. f. (1882).

Alstonia Schumanniana Schlechter, in Bot. Jahrb. 39: 236. 1906.—descrip; Pflanzengeograph. Glied. Insel Neu-Caled. 37. 1904.—*nom. nud.* Type.—"Bei Oubatche. *15442*" Schlechter, New Caledonia. (! G, K, L)= *Rauvolfia.*

Alstonia theaeformis L.f.=*Symplocos* (see discussion under *Alstonia*).

"**Alstonia** sp. nov." Schlechter, in Bot. Jahrb. 39: 236. 1906. *Schlechter 15651* (New Caledonia, "Bergen bei Ou-Hinna"; BM, K). Not *Alstonia*: apparently Rubiaceae. Not adequate for specific identification without comparative material. Suggests description of the monotypic genus *Merismostigma* S. Moore (1921: 332).

SUPPLEMENT

While my manuscript was in the editor's hands, M. Pichon's recent (1947) treatise on *Alstonia* became available to me. Except for inserts in the synonymy citations in my original manuscript, the matter in this excellent paper was not treated. A very brief account of the important features in Pichon's article will be given here.

The most interesting discovery made by M. Pichon is the close similarity between *Alstonia*, which had hitherto been given exclusively an Old World distribution-range, and the New World *Tonduzia* Pittier (Central America and southern Mexico). Can it be that *Alstonia*, which in the Pacific is known as far east as the Marquesas and which extends as far west as Sierra Leone in Africa, has bridged the remaining oceanic areas and encircles the entire earth?

Pichon gives *Tonduzia* a sectional status next to § *Pala.* In *Tonduzia* the leaves are usually

3- or 4-verticillate, pointed at the apex, and have close lateral nerves; the left margins of the corolla lobes overlap, and the follicles are apocarpous. At first sight, *Tonduzia* might suggest an anomalous species in § *Dissuraspermum,* with contrariwise aestivation. This impression is particularly supported by its apparent seed character. The seeds of *Tonduzia longifolia* (A. DC.) Markgraf superficially resemble those of *Alstonia constricta,* except that they are glabrous on the sides. They are elliptic, about 10 mm. long and 3 mm. broad, somewhat erose at one end, and with a short (about 2 mm. long) bifurcate tail at the other end. These seeds appear ciliate along the margins in the manner of § *Dissuraspermum.* But when examined closely the seeds of *Tonduzia* are found to be not at all ciliate with simple distinct hairs as in *Alstonia.* Instead they are surrounded by a membranous border which is finely and repeatedly lacerate. Principally because of this difference in the actual morphology of the seeds in the two genera, I judge it best to maintain *Tonduzia* separate from *Alstonia.*

In proposing that *Blaberopus* A. DC. be returned to generic status, in which category it was held by some of the older botanists, Pichon has selected the section of *Alstonia* most deserving of such rank. I have already noted this in my comments under the synonymy of *Alstonia,* and my continuing to give *Blaberopus* sectional rather than generic rank is largely a matter of personal inclination. The differences between the sections *Pala* and *Blaberopus* are admittedly great, but are they of generic magnitude? If considered so, what shall be the disposition of *Dissuraspermum,* a section which also presents great divergences from *Pala?*

Winchia is also accepted as a genus by Pichon. There is little in favor of this. In fact, it might be argued with considerable reason that *Winchia* be altogether submerged into the § *Pala.*

Paladelpha Pichon was typified by *Alstonia angustiloba,* which is here placed in § *Pala.* The characters stressed by Pichon in segregating the new genus are the narrow anthers, 2-pored compressed pollen, the ovary provided with some hairs, and the clavuncle slender, glabrous, with spreading collar. I find the flowers of *A. pneumatophora* hardly distinguishable from those of *A. angustiloba.* The leaves of the former resemble closely those of *A. spatulata.* These three species bear unmistakable affinity with *A. scholaris,* the type of the § *Pala.* The indumentum is often lacking (*A. angustiloba* var. *glabra*) on the ovary of *A. angustiloba.*

Pichon proposes two series, *Glabrae* and *Pilosae,* under § *Pala.* In the series *Glabrae, A. spatulata* and *A. sericea* are cited as species studied, and *A. pachycarpa* as seen but without flowers. The last species belongs in § *Winchia,* whereas *A. sericea* is most probably a synonym of *A. neriifolia* in the § *Blaberopus.* In the series *Pilosae,* Pichon cites as studied *A. Gilletii, A. congensis,* and *A. scholaris.* The first species listed is *A. congensis,* and the second very likely *A. Boonei.* The two series are represented by primary subdivisions in my key to the species in § *Pala.* I do not believe they merit formal names.

Also, Pichon proposes two series under § *Dissuraspermum.* His series *Occidentales* corresponds largely to the § *Monuraspermum* already presented in my original manuscript. *A. constricta,* which Pichon cites as one of the species studied for the series, more properly belongs in § *Dissuraspermum* than in § *Monuraspermum.* Of the species noted as seen but not studied in this series, *A. grandifolia* belongs with *Dyera costulata,* and *A. pneumatophora* in § *Pala.* The series *Orientales* is typical § *Dissuraspermum.*

Finally, Pichon (1947: 298) attributes to Guillaumin four *Alstonia* species, of which I have seen neither specimen nor description or any other reference. These are: *A. Balansae, A. linearifolia, A. stenophylla,* and *A. undulata.* These species do not appear under *Alstonia* in the Kew Index up to the 1940 Supplement. It is quite probable, however, that Pichon, in the

Laboratoire de Phanérogamie du Muséum, Paris, had access to literature not available to me. He notes that he studied these species, which he places in § *Dissuraspermum*. Therefore, Pichon must have had actual material of these species on hand.

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